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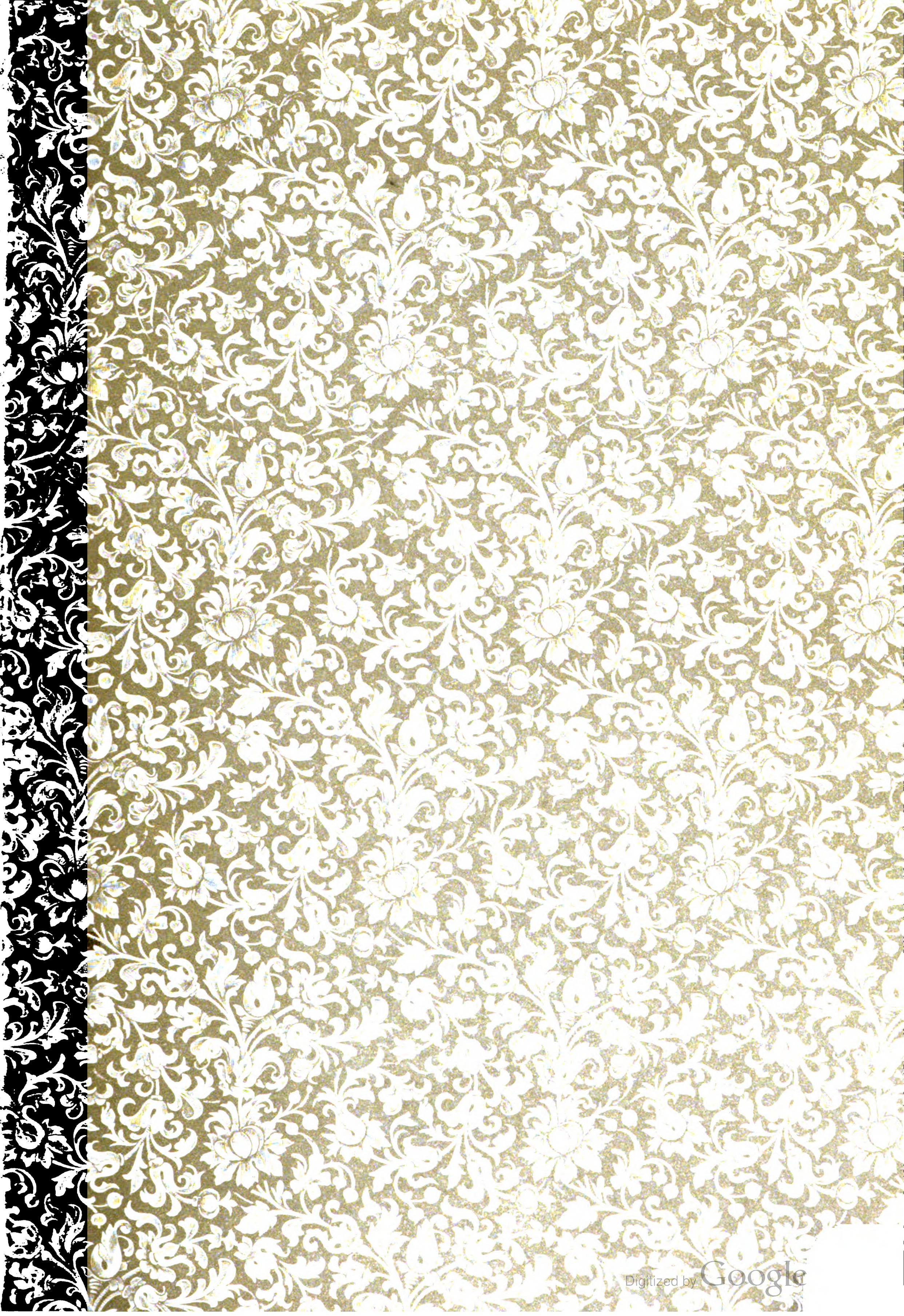

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To Prof. Emory R. Johnson.

PREFACE.

In extenuation of some of the more obvious defects and shortcomings of this book, the author desires to state that it is intended in no sense as a complete treatment of the general subject of the passenger traffic of railways. The book was begun in Europe at a time when the author was disposed to advocate a theory which he now considers erroneous. The present book therefore neglects the treatment of certain questions of interest to the American public, and while it contains in part the foundations of a superstructure, since abandoned, the original work has been much curtailed. For any merit which the book may possess, the reader is under obligation to Professor Emory R. Johnson, of the University of Pennsylvania and of the Isthmian Canal Commission, but for whose assistance and encouragement these essays would not have appeared.

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INTRODUCTION, SUMMARY AND CONCLUSIONS.

In first attempting, some years ago, the study of the passenger traffic of railways, the author of this book was influenced by two considerations; first, the feeling that this important branch of the railroad business had received scant attention, and second, that the returns from the passenger traffic showed that railroads in practically all countries had succeeded to a less extent in settling the problems of passenger transportation than in solving those of the transportation of freight.

The general scope and tenor of these essays have been influenced by the ideas which the author had at the time of their inception. At that time he believed in the efficacy of the zone-tariff and in the possibility of applying this principle generally to the passenger traffic of most countries. The principle of the zone-tariff is that the cost of transporting a passenger a long distance is scarcely, if at all, greater than that of conveying him a short distance, and that the whole distance to be traveled may be divided into two, or three, or four zones, and a uniform fare be charged for any journey within the same zone.

The underlying thought in the zone-tariff, however, and the object which animates the upholders of this theory is not so much the form as the amount of the fare. The problem is not so much what the relation should be between the fare for a five hundred and for a twenty mile journey, as how cheap both these journeys should be. The demand for a zone-tariff is really a demand for low fares, and for what may be called the "democratization" of travel. The particular form which this desire has taken, namely, that of a demand for the reduction of long-distance fares, has been due to an analogy between passenger fares and postage rates. The postal reforms, culminating in England in the general introduction of penny postage for letters within the kingdom, however great or small the distance conveyed, were a thorough application of the principle of the zone-tariff, and resulted in a reduction of postage rates for all, and especially for long distances.

The immediate effect of the postal reforms in Great Britain was a pecuniary loss to the government. While the principle adopted was undoubtedly correct, the actual, immediate result, judged from the narrow point of view of government revenues, was bad, the reduction in rates being so radical that for a number of years the postal receipts of the country were considerably lessened. The ultimately beneficent results of the change cannot, of course, be called into question, since not only have postal revenues been vastly increased, but the industrial, social and intellectual progress resulting from the reform have been enormous.

My original study of the passenger traffic of railways was based on the thought of carrying out the analogy between postal and passenger revenues to its conclusion, and with the hope of determining whether a radical reduction in fares, whether or not in the form of a zone-tariff, could be justified from the point of view alone of the self-interest of the railway companies or administrations. Even in countries in which the railways are owned by the state, there is a strong opposition to any policy likely to cut down revenues even temporarily, and in countries of private ownership, this opposition is still more potent. It seemed to me, and still seems to me, that in very many cases, railroad companies or administrations have held their passenger fares at a rate higher than what the traffic would bear, and have adopted higher passenger fares than their own immediate interests have dictated. The original object of my study was to prove this fact and to show statistically how the passenger traffic would normally develop under a radical reduction of fares.

I am now convinced that the value of such a study would be slight and that the disturbing factors are too many and potent to permit the determination of any but the most general rules for the development of the passenger traffic. In comparing the passenger traffic in different countries, the chief difficulty lay in the varying methods of keeping statistics and in the radical differences in the things compared. The apparent volume of the passenger traffic depends upon the manner in which the statistics are presented, whether and, if so, how season ticket travel and military traffic are counted, where urban or street car traffic leaves off, and whether the number of travelers, the total passenger mileage covered, etc., shall be the factor considered. There is not, and naturally, cannot be, a normal amount of traveling per capita for all countries and even in the same country, the differences between states or provinces or within the same province are so great as to invalidate any attempt to arrive at a result as to what the normal traffic should be. The most casual study shows the results of certain factors and permits the laying down of certain general (usually too general) results. Thus for example, the amount of traffic will of course increase with the population of the country and will increase more than proportionately with the density of the population. As a general rule, the number of travelers in a country with fifty million inhabitants will be greater the smaller the area of the country, and while the average length of the trips in the country of larger area will be greater, the total passenger traffic measured in passenger miles will be greater in the country of smaller area and denser population. In its most general form the rule is that the attraction of two points for each other will be in proportion to their size (or some power greater than one of their size) and inversely to the separating distance (or some power greater than one of the separating distance). The passenger traffic between various cities, and especially in small densely settled countries, leaves little doubt of the general truth of this apparent rule, but the law is too general to admit of very definite, practical results.

The passenger traffic of a country will also increase in the proportion in which the urban population preponderates over the rural. The passenger traffic of England, Belgium, Germany and several other countries shows the relation between the number and size of cities and the growth of the passenger traffic. This proposition, however, which may be proved statistically, may be established even more clearly without the use of comparative statistics of the passenger traffic of various countries. The opportunities offered by cities, where the population is conveniently agglomerated, are far greater than in a population of similar size, but less densely settled, and perhaps the greatest development in the railway service has been the growth of a vast suburban traffic. Closely allied to the factors of density of population and the preponderance of urban population is that of the relative size of the industrial as compared with the mining and agricultural population, the per capita passenger traffic being greater in the countries with large industrial populations.

Another factor influencing the volume of the passenger traffic is the general civilization and progress attained by nations, a factor which may be shown by a casual study as well as by a more elaborate comparison of international statistics. The growth of the passenger traffic in all countries has demonstrated this fact, and the difference in the passenger development between Ireland and England or Scotland, Italy and France, Spain and Germany, Russia in Europe and the United States, shows to what an extent this is true. A comparison between the school statistics and the passenger movement, or between the proportion of illiterates in the army and the number of passengers in various countries is unsatisfactory, owing to the former statistics being defective, but in the main it serves to bring out the same result. A more striking correspondence is shown between the per capita number of letters and the number of railway passengers in the countries of the world. The postal statistics show better than almost any other single thing the comparative civilization attained by a nation, but this fact must be borne in mind that unlike passenger fares, which as a general rule are cheap in the poor countries and dear in the rich ones, the rates for domestic postage are approximately the same in all countries and are independent of the distance moved by the mails.

In a general way, therefore, the results of a comparison of passenger statistics the world over show that the amount of traffic increases not only with the population of the country, but with the density of that population, with the number of cities, the preponderance of the industrial over the agricultural population and with the wealth and the general standard of intelligence and civilization of the country. What holds true in a comparison between various countries is equally true as between different parts of the same country. Between Saxony and Silesia, Lancashire and Cornwall, Massachusetts and Florida, there are as radical differences as between England and Turkey, France and Norway, or the United States and Russia.

In practically every civilized country of the world there has been a rapid and fairly continuous growth of the passenger traffic from the beginning. This growth has been most rapid in countries in which the population has been growing most rapidly, but in practically every case the extension of the traffic has been more rapid than that of the population of the country. This is shown by the statistics of traveling per capita, which is everywhere increasing, and the statistics of which are presented in the following pages. The increase in the per capita traveling demonstrates that the people are being educated to this form of activity and that the demands of industrial life are resulting in a constantly greater use of the instruments of transportation. The increase in the passenger traffic is usually more violent and irregular, and more subject to great changes in its earlier years and in countries in which economic conditions are most unstable, the increase in the traffic on English railways during the last thirty years being more regular than in any other country or during any other period. The increase in the passenger traffic corresponds closely to changes in the industrial situation, the traffic increasing far less rapidly and frequently actually decreases during panics and periods of business depression, while increasing with remarkable rapidity during periods of industrial recovery and intense industrial activity. The statistics, furnished later, show that just as these industrial depressions have spread all over the civilized world, so there has been a synchronous decline or rise in the rate of increase of the passenger traffic in the various countries of Europe.

Wars have also been potent in influencing the volume of the passenger traffic, due to the use of the railroads for military purposes and to the complete derangement of the industrial organization of the State. The years 1859, 1866 and 1870–71 witness considerable declines in the volume of the passenger traffic of the European states affected, both directly and indirectly, since the increased movement of troops does not nearly make up for the decreased movement of ordinary passengers. The effect, of course, varies with the size and duration of the war and is considerably greater in the case of the invaded than of the invading nation. In France the effect of the war of 1870–71 is extended over several years, owing to the levying in 1872 of an additional tax upon passenger traffic, which limited for a time the opportunities for travel of the already impoverished population. The effect of expositions such as those of 1867, 1878 and 1889 in Paris was to increase vastly the existing passenger traffic, and the present exposition (1900) will doubtless have the same, if not a greater, effect.

There are many other factors influencing the volume of the passenger traffic, some of which have been considered under the head of the inducements to and deterrents from travel. The variations in the seasons exert a great influence upon the volume of traffic, there being a remarkable sameness for years at a time in the proportion of the traffic which takes place in any given month, the variations usually being due to great changes in the weather or to the unusual falling of holidays or other days of leisure during the period in question. There is also a remarkable similarity in the balance of passenger traffic in opposite directions, as compared with freight traffic where the preponderating bulk of the traffic is in one direction.

The most noticeable general feature of the passenger traffic in most of the countries of the civilized world is the diminution in the average length of the trip. In the freight traffic, the general tendency is toward a longer haul, with the greater concentration of industry and the widening of the markets of the world. The decline in the average distance traveled by passengers is not due to an absolute decline in the number of long trips undertaken, but to a vastly more than proportional increase in the number of short trips, especially in the suburban business. Until the railroads of a country are fairly well developed, and until the first amalgamations have taken place, the tendency is toward the lengthening of the average trip; subsequently the trip rapidly diminishes in length.

At the same time there is a tendency, although less marked, toward the running of emptier passenger trains, and upon the whole the number of passengers per train and the proportion of occupied to unoccupied seats seem to be diminishing. This tendency is directly opposed to that observed in the freight traffic, where train loads are increasing with wonderful rapidity and the proportion of net weight to tare constantly improving. The general proportion of occupied to unoccupied seats on European railways ranges from one-third to one-fifth, or more exact still, from one-fourth to one-fifth, while the general average on American railways appears to be still more unfavorable. This unfavorable average serves as a basis for the advocates of the zone-tariff, who allege that with very cheap fares two or three times the number of passengers, or even a greater number, could be accommodated with the same number of trains. This appears to be a considerable exaggeration, as the density of the traffic does not seem to have so very favorable an effect upon the utilization of the rolling stock, and it may incidentally be stated that the remedy proprosed by several of the advocates of the zone-tariff for improving the utilization of passenger cars savors strongly of more than ordinary ignorance of the first principles of railway management. After all, the importance of the complete filling of cars is somewhat exaggerated (at least for many lines), since the cost of railway operation depends to only a degree upon the number of cars run. In many cases, also, a good utilization of cars is accomplished only by giving the poorest conceivable service.

Another tendency observable in the passenger traffic in most European countries is the trend of the traffic toward the lower classes. On European railways the cars are usually divided into two, three or four classes, ranging in cheapness from the fourth to the first. In all countries the tendency has been for the cheaper and poorer classes of traffic to grow at the expense of the higher classes, or at all events, at a rate of growth entirely out of proportion to that observed in the higher classes. This tendency in the passenger traffic is paralleled in the freight traffic, where the transportation of the heavier, bulkier and cheaper commodities has grown at a much more rapid rate than that of the lighter and more valuable commodities. The cause also is in both cases the same. With every improvement in the technique of railway operation, the railroad has widened its circle of usefulness and has performed services, in which the margin of profit and of utility is less. The statistics of practically all countries show that the vast increase in the third-class traffic has been largely on the short distance traffic, the average distance traveled in the third class being much shorter than in the second, which is in its turn much shorter than the average distance traveled by the first-class passenger. The obvious reason for this is found in the decreasing importance of comfort for short distance and especially for suburban travel. The fourth class, however, reaches a section of the population to whom comfort is quite unattainable, and who in other countries would be almost completely debarred from travel, and in this class the average distance traveled is considerably greater than in the third class.

The trend of traffic to the lower classes on European railways is the chief means of lowering the cost of transportation. With the exception of the countries where the zone-tariff is in operation, and fares are fixed for each zone traversed, the passenger fares on continental railroads are upon a kilometric (or mileage) basis. These rates are fairly constant, and the reduction in fares has been due, first, to the making of a large number of special reductions, and second, to the shifting of the traffic from the higher and more expensive to the lower and cheaper classes.

Upon the whole there has been a considerable decline in the average passenger fare collected per mile of distance traveled in most of the European countries as well as in the United States, but this decline is almost negligible when compared with that which has occurred in freight rates. While passenger fares have declined, freight rates have declined to a far greater extent. This difference, however, is in part explicable. The improvement in railroad transportation has been chiefly in the direction of tractile power, the increased weight and durability of the rail, the greater size of the cars and the enhanced power of the locomotives contributing to this result, while the vast improvements in loading and unloading, and the increased size of shipments, resulting from the concentration of industry, have also aided in this development.

In the transportation of freight, further, the railroads have frequently had to compete with the ocean, the Great Lakes, the canals and navigable rivers, or with other railroads, and the possibility of shifting many of the expenses of the road from competitive to non-competitive traffic has resulted in a very great reduction in freight rates. In the passenger traffic, on the other hand, competition is far more restricted and far less potent, and increased capacity of trains and increased hauling power of engines have but little influence on the question of fares. Moreover, the demands made by passengers have grown apace and the comfort, speed, safety and convenience of travel have been increased, so that the service of to-day is far superior, on the whole, to that of previous decades. In the present work, I have avoided entering into the subject of the relative merits of the passenger service in various countries, since it is so largely a matter of personal feeling and individual judgment.

Where passenger fares have been reduced, however, the usual result has been an increase in the traffic which more than compensates for the reduction. This rule is neither general nor absolute, and the effect when beneficial is not always immediate or capable of exact statistical calculation. The general rule (which holds good for the prices of nearly all services and commodities) is that a reduction in price will call forth an increase in demand and in the railway service the greater the demand, the less the cost at which each part of it can be satisfied. Certain forms and kinds of passenger traffic, however, are more susceptible of stimulation; in other words, react more readily to a reduction in fares than others, and it is usually to the interest of the railroad to reduce fares on these varieties of traffic rather than on others less susceptible to stimulation. Hence have arisen the numerous special reductions, commutation tickets, season tickets, etc., based on the idea of especially favoring the traffic which will most surely and completely be influenced by such reduction. Herein also lies a defect of the zone-tariff, in so far as it is a favoring of long-distance at the expense of the short-distance traffic. The experience in several countries (notably in Hungary) has demonstrated that even under a moderate application of the zone-tariff principle, the short-distance traffic is far more susceptible to stimulation than the long-distance traffic.

The rule that reduced passenger fares call forth increased traffic, while in the main true, is subject to limitations. The success of such a policy depends upon the existing fare, the density and wealth of the population served, the volume and character of existing traffic, the frequency, convenience, comfort and speed of the service offered, the length of line upon which the reduction is operative, the attitude and policy of competing carriers, and many other factors. The lower rates are before the reduction the less will be the effect of any scaling down, and unless the service grows to accommodate the potential traffic to be created by the reduction in fares, this traffic may fail to materialize and the reduction in fares remain nugatory.

In the United States, the railroads have adopted the principle of high fares and good service. The fares are not high because the service is good, but the service is good because the fares are high. As a rule, and with the exception of certain extreme cases, good service does not necessitate heavy expenses or high fares, and it is just in those parts of the United States where the service is worst that the fares are highest. The good service is an attempted justification rather than a cause of high fares, and while good service is to be desired, it is evident that many of our railroad companies have carried the principle too far. The decreasing number of passengers in our trains and the small and rapidly decreasing receipts per passenger train mile throughout the United States (except in New England, where fares are lowest) show that at least for many of the railroads excessively high fares operate to their disadvantage. The railroad companies, or at least many of them, do not realize the potentialities of the American passenger traffic. The total number of our railroad trips is far smaller than those of Great Britain, and our total travel in passenger miles per head of population is also much smaller. A reduction in fares is obstructed by the deep-rooted conservatism of many managers, although it must be confessed that there are influences not under the control of the individual railroad company which act in the same direction, notably the fear of the cut-throat competition of other lines and the organized brigandage of ticket-brokers. In the main, however, it may be said of many lines that they have failed to consult their own interest in not attempting by concerted action to secure a radical reduction of passenger fares, and that they have also failed in what should have been recognized as their plain duty toward the traveling public, even if, what is improbable, it might have resulted in a temporary diminution of net revenues.

The defence of the American railroad company against the allegation of excessive fares is that the first-class fares in the United States are cheaper than in Europe, while the service is better. This may be conceded, but it does not alter the situation. While the well-to-do may perhaps travel both more cheaply and more comfortably on American railways, the great mass of the public is debarred from a frequent use of the railroad. The introduction of second-class cars is debarred as being allegedly inimical to the spirit of American institutions. The objection is urged so persistently that it deserves a reply despite its triviality and disingenuousness. The division into classes already exists, since an extra charge is made for parlor cars, and even free-born Americans have been known to go to Europe second-class, to go to second-class hotels, and even to sit in the gallery of a theatre. It is a well-known fact that most people will tolerate class distinctions based on differences in price far more readily while traveling than at home, since it affects less their social standing, and on railroads it is still more endurable, since there is no record of their having traveled in any way but first-class. If there were introduced a cheap, comfortable, second-class service, which differed from the first-class chiefly (though not wholly) in name and price, there would be many new passengers who at present forego traveling, while a very large number would travel first-class for the distinction of so doing.

The rapid extension of electric railways is perhaps destined to do more for the reduction of passenger fares than the most urgent appeals of the outside public. The essential merit of electrical power is its divisibility, in other words, its possibility of being economically used in small units. As steam is best adapted for heavy freight traffic, so electricity is best suited for light freight, express and passenger service. Besides being cleanly, rapid, safe and economical, the electric railway invites in many cases junction with existing street-car lines, and permits a far better utilization of passenger rolling stock than the steam railroad. The future development is in the lap of the gods. The present street railways and interurban street railways may be indefinitely extended along the public highways; new electrically operated railways may be chartered under general enabling steam railroad acts, or the present steam railroads may use electricity either alone or in conjunction with steam power. But however the development may shape itself, it seems probable that it will be in the direction of the growth of a vast electrically conducted passenger traffic and a radical reduction in passenger fares, both on electric and steam railroads. Whether the steam railroads will stave off possible competition by a radical reduction in fares, or whether the stable-door will be closed after the horses have been stolen, is a question of railroad policy reserved for the immediate future. The duplication of railroads by the contemplated construction of electric railways is fraught with certain, at least temporary, evils in a country like ours, where vested interests are lightly regarded; the probable radical reduction of passenger fares, however, may be regarded as one of the probable benefits of the present development.

CHAPTER II.

THE EFFECT OF IMPROVED TRAVEL UPON SOCIETY.

Among the vast industrial, political and social changes which the railways have produced, the least emphasized, but certainly not the least important, have been those arising from the improved transportation of persons. The abridgment of distance has been as important in the case of persons as in that of things, and the railway has ministered to the welfare and accelerated the progress of nations as much through its passenger as through its freight traffic.

Economically considered, the passenger traffic of railways is a complement and, in another sense, a corollary of the freight service. Economic processes are only possible when the producer is brought into contact with the raw material and the consumer with the finished product. Production involves a change of place either of persons or things or of both, and similar processes are required before consumption is possible. In the great industrial centres, producers living often at a considerable distance must daily be carried to the common factory, whither the raw material is conducted from a still greater distance, and agriculture, fishing and mining require a similar movement of persons. Exchange of products also calls forth a considerable movement of persons, and in the consumption of wealth, either the consumers themselves, the goods consumed, or both consumers and goods must suffer a preliminary change of place.

The extent to which the two services of the railway are complementary is shown by the change in place of persons resulting from an obstruction to the movement of things. The usual method of society is to force the mountain to come to Mahomet, but where this is impossible the prophet goes to the mountain. Thus, an American import duty on goods of German manufacture may have the effect of causing German employes to migrate to the United States. The passenger and freight services are also complementary to the extent of the one performing the work of the other. Upon the whole, however, they act upon different objects in a similar manner. The changes resulting from an improved carriage of persons are similar to those arising from a better transportation of things. The cheap conveyance of freight created a national and even a world market for commodities; the reduced cost of transporting persons has resulted in a wider market for labor; the leveling of prices has been followed by the approximation of wages, and the increased portability of commodities has been accompanied by an enhanced "viability" or mobility of persons.

It is not accurate to ascribe the fundamental changes arising from the greater mobility of persons to the railway alone, or to any other single instrument of locomotion. Contributing to the same result have been a number of other factors, some contingent upon, others independent of, the great advance in railway transportation. The improved dissemination of intelligence by mail, telegraph and telephone, the advancement in the means of education, the increase in the amount of leisure have facilitated many social changes, primarily due to improved means of transporting persons. In many instances, moreover, the increased railway traffic has brought forth changes which, in turn, have aided still further in increasing the volume of that traffic.

One of the chief results of the cheapening of land transportation of persons has been the increased mobility of labor. This phenomenon, which is to be attributed equally to the passenger traffic of ocean vessels, has exerted an all-important effect upon the economic constitution of society. The vast migrations which have peopled the New World have been, in the main, a movement of workers seeking a better market for their labor, and the flood of Italian, Belgian and German workingmen into France, and the late invasion of Australia and America by the Chinese are similar phenomena. Immense as is this traffic from land to land, however, it is dwarfed by the immensely superior migrations of laborers within the same country. In the United States railways were extended into regions previously uninhabited, but where the railway led, population followed. From the crowded markets of the East the stream of labor flowed westward in a mighty current, and a synchronous movement took place in many European countries. The railways rendered the cities accessible to the rural districts, and the mobility of the population permitted millions of the inhabitants of the country to populate the cities. This migration is not limited to workingmen seeking a permanent change in residence, but is frequently temporary in character. Thus every summer witnesses great migrations of the poorly-paid farm laborers of Eastern Prussia to other parts of the German Empire, while the yearly movement of Canadian laborers to New England illustrates the temporary migration of an industrial population.

This increased mobility of labor, however, is perhaps not so great as might at first sight be supposed. In new countries generally, and more particularly in the United States, labor moves freely from one place to another, but even here local attachments and feelings, the responsibilities of family and the natural inertia of human kind places a check upon unlimited movement. In Europe, and in Oriental countries to a still greater degree, the workingman is still more deeply rooted to the soil. There ignorance and inherited prejudices bind both the industrial and the agricultural laborer to a fixed place of residence, and even where the legal right of emigration and expatriation exists, the barriers placed upon the admission of foreigners and the ignorance of foreign languages and customs prevent the ordinary workman from seeking higher wages in neighboring countries. A difference of a fraction of a cent a bushel will send wheat to Liverpool or to Amsterdam, but a much greater inducement is required to persuade a man to change his local habitation. Man remains now, as in the days of Adam Smith, the most difficult commodity to transport, although the increased ease of travel does permit the laboring class as a body to take greater advantage of higher wages in another part of the country than ever before in history. On the other hand, the employer is able to make an equally effective use of the increased mobility of labor, as may be seen by the readiness with which a number of strikers may be replaced by workers from adjoining districts. So important indeed has this feature of industrial life become that the working classes have been forced to put an artificial limitation upon their own mobility. The attitude of the trade unions toward the introduction of "scabs," or non-union men from without, and the federal legislation against the importation of contract laborers may be cited as illustrations of this tendency.

The improved means of transporting persons have co-operated with the more rapid and effective interchange of intelligence in effecting political changes of considerable importance. The most apparent of these changes have been the growing centralization and the wider application of the principle of representation. At one time it was thought that a commonwealth should not contain more than a few thousand souls, and at the time of the adoption of the Federal Constitution of the United States it was held by some that three presidents would not be too many for so vast a territory. The improved transportation of persons and intelligence, however, is now leading to the substitution of larger for smaller political units, by removing the barriers placed by distance to the extension of political control. As far as speed of movement is concerned, New York is now as near to Moscow as it was to Pittsburg a hundred years ago, and in the matter of the transmission of intelligence is nearer at present to Constantinople, Santiago or Melbourne than it was to Brooklyn in the last century. As far as distance alone is concerned, it would be feasible effectively to govern the whole world from a single point.

The increase in the size of states has frequently been accompanied by the extension of the principle of representation, which in turn has been rendered possible by the increased ease of movement among the population. The same forces, however, which have produced federal states seem to act in the direction of further converting them into unified states.

International relations have also been modified by the freer travel of to-day. In almost all countries the right of expatriation is now acknowledged, although restraints are still placed and are likely to continue to be placed upon the immigration of foreigners. The system of passports is being limited in application, and while the baggage and other effects of international travelers are subjected to custom inspection, concessions have been made, even upon this point, to the requirements of speed and to the comfort of traveling. The state often puts a legal sanction upon a privilege already exercised, and thus the freer travel of the last century has generally resulted in the formal acknowledgment of the right of the citizen to move freely within his own country.

The cheaper and more rapid movement, which the railway permitted, has, moreover, produced political changes still more subtle in their character. The railway has effected a democratization of travel, and the former distinction between those who could travel and those who could not, between those who rode horseback and those who went afoot, has been but feebly reproduced in the difference between first- and third-class travel, between travel in an ordinary day-coach and travel in a Pullman car. In India the Brahmin has been obliged to ride in the same compartment as the low caste, and an American street car furnishes one of the most democratic spectacles that may well be conceived.[1]

The political and social changes which result from the improved means of travel are almost too numerous to be cited. Many of the legal and political maxims of other days bid fair to be invalidated by the improvement in passenger facilities. In small states it is no longer of importance to locate the capital near the geographical centre, and it has been claimed that for all practical purposes Philadelphia could as easily be reached by legislators from the western part of Pennsylvania as the present, and more centrally located, capital, Harrisburg. The old custom of three days of grace arose from the necessity of making allowance for the uncertainties and delays of travel, and there are numerous other survivals in our law of a more primitive state of traveling. Crime and its detection have become international, and extradition treaties exist for the repatriation of fugitive law-breakers. Lingual, racial and climatic differences still present hindrances to international travel, but these barriers are daily becoming of less importance. The days are past when stranger and enemy were synonymous words, and consuls exist for the safety and comfort of the traveler to foreign lands. The direction of parties of travelers has been made the object of great industrial enterprises. In countries like Switzerland the international traveler may almost be regarded as one of the national resources to be exploited, and the expenses of the wealthy class of traveling and resident foreigners are sufficient to visibly affect the balance of trade.[2] The Englishman or

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[1] The exclusion of negroes from the compartments for whites in many Southern railways is a striking exception to the rule of equal accommodations for all. Fortunately the prejudice against the black man is no longer carried to the extent of depriving him of the right of using the street car at all.

[2] Gide (*Traité d'Économie politique*) estimates the yearly expenditure of the leisure foreign population of France at 365,000,000 francs, or about seventy millions of dollars.

American can obtain abroad books and newspapers, sermons and lectures in his own language, and like provision is beginning to be made for travelers of other nationalities.

The growth of great cities has been due not so much to the increased mobility of the population as to the vastly enhanced portability of goods. The size of cities, as also the centralization of industry and the division of labor are limited by the extent of the markets, and the size of the market is limited by the rates for ocean and railway freight. The movement of freight necessitated by the existence of a great city is immeasurably superior to the movement from the outside of persons which it must call into play. The effective size of a city, therefore, is limited not by the ease with which outsiders can reach it, but by the facility with which the citizens themselves can travel within its bounds. Legally a city may have any area from a dozen acres to a thousand square miles, but the real and effective limits are set by the distance at which the workman's residence may conveniently be removed from the place of work, which is in turn limited by the speed and cheapness of urban travel. If the available time be an hour and a half, the effective area of a city situated in an open plain would be 64 square miles if the rate of travel is three miles an hour, 177 square miles if it be five miles, and 710 square miles if it be ten miles an hour, unless of course high fares replace the barrier removed by speed.

The development in the means of urban locomotion, from the omnibus to the horse-car, and from the horse-car to the vehicle driven by steam, electricity or other mechanical power, has led to a remarkable territorial expansion of cities. Whether followed or preceded or whether totally unaccompanied by an increase in the legal limits of the city, this effective extension of the area in which the citizens might live has been a great benefit to the city and to its inhabitants. The crowded central districts of great cities are being emptied of their residences and are being devoted exclusively to business interests. In the seventeenth century the London city man had an intense civic pride because he not only worked but lived there. But Greater London is now becoming a hollow, circular disc, and while the resident population of the second and outer rings is rapidly increasing, that of the inner ring is rapidly decreasing. Similar tendencies are visible in Berlin and other Continental cities, while in American cities, where uniform street railway fares are the rule, the development is unusually rapid. While the slum population has as yet been but little affected, the misery attending overcrowding of the great mass of the laboring population has been greatly alleviated. The health and recreation of the inhabitants of urban centres have also been ministered to by hosts of excursion trains that ply between the cities and the country, mountain or seaside resorts, and charitable organizations (Fresh Air Societies) are making the summer outing occasionally accessible to even the poorest city waifs.

It has been said that we live in an age of discussion, and the extent to which this is a fact is largely to be attributed to the improvements in passenger transportation. The great annual congresses (religious, scientific, etc.) which attract representatives from all corners of the earth would be almost impossible without rapid and cheap transportation facilities. The first great industrial exposition of 1851 did not fulfill the hope that it would introduce an era of universal peace, but the age of expositions may at least be said to be co-terminous with the age of railway travel.

One of the most important effects of the improved transportation of persons has been the revolution in the art of war and in the character of standing armies. The railway has allowed a nation rapidly to concentrate hundreds of thousands of men upon a frontier. The management of great bodies of soldiers which has thus been facilitated has contributed to the vast increase in the size of armies, to the substitution of national for mercenary armies and to the intensity and consequent infrequency of international wars. The size of armies was formerly limited by the impossibility of controlling and quickly concentrating large forces, which limitation has been removed by the railway.

There are many other effects arising from the ease of travel between different countries or between different parts of the same country. Access to the city has tended to change the character both of the city-man and the country-man, by bringing them into closer and more frequent contact. The liberalizing influence of travel is evidenced by the antagonistic attitude toward it adopted by certain European governments. Not many years ago it was supposed that the German Social Democratic Party was doomed to shatter against the "anti-socialistic peasant skull," but it is now conceded that the railway-car and the barrack-room are introducing the peasant to the arts, amusements and political opinions of the city.

The ease of travel brought about by the railway has resulted in a considerable increase of comfort and has aided to a large extent the development of the last fifty years. It would not be correct to ascribe to it all that has been accomplished during the last half-century, or that all of its effects have been beneficial. It will readily be admitted, however, that according to the ideals of the great majority of Caucasians, the changes brought about are such as have been on the whole to society's advantage, and that a further development along the same lines would in consequence be desirable.

In the following chapters it will be shown to what extent improved railway facilities have allowed the extension of traveling and in how far it is now an important element in our lives. It will become evident, however, that while the development has been rapid and considerable, there still remains scope for much further development.

CHAPTER III.

THE TRANSPORTATION OF PERSONS.

Transportation may consist in a movement of persons or of things. Railroad receipts usually include earnings from freight, from express, and from mail traffic; but all these activities may be included under the head of transportation of things as distinguished from transportation of persons. In the same category may also be placed the transportation of corpses, which is not included in the passenger traffic.

Transportation of persons, however, is not limited to movement by rail. There are numerous other agencies of transportation, and a vast movement takes place by other means of conveyance. The present instruments for transporting persons are the result of a long development from the travel of primitive times to the highly organized movement of persons which now exists.

It is not necessary to trace in detail the development of travel from primitive times, nor to point out the fact that most, if not all, of the means once used for conveying passengers still exist in some part or other of the world. The most primitive means of travel is that of walking, and it is probable that the vast majority of the some 1,500,000,000 inhabitants of the world to-day rely almost entirely upon the power of the human leg for whatever traveling they do. The domestication of the horse, the camel, the elephant, the reindeer, the dog, and other animals, the later development of vehicles, and the construction of roads form epochs in the history of traveling, while a similar development has taken place in the navigation of rivers, inland seas, and, finally, of the great ocean itself. With the application of steam to the railed road, and with the practically contemporaneous application of the same motive power to water transportation, there occurred a radical and far-reaching revolution in the methods and opportunities for the transportation of persons. This development has since continued with increasing rapidity until, at present, the movement of persons has attained a remarkably high degree of perfection.

It is in great cities, however, that the transportation of persons has become most highly specialized, and in which the most perfect means exist for the rapid and safe transportation of large numbers of people. The cities of the present century, and above all of recent decades, were practically unknown in the past. The vast agglomerations of ancient times were composed of loosely connected units; and cities on the scale of London, New York, or Paris, have never before existed. As the division of labor is limited by the extent of the market, or, in other words, by the means of freight transportation, so is the territorial growth of a city limited by the rapidity of intercourse between its centre and its periphery; in other words, by its means of passenger transportation.

The cities of to-day contain, therefore, the most highly developed instruments for the transportation of persons. The railroads carry a vast number of persons from other cities and from the surrounding territory into the heart of the city. The omnibus has given way to cars drawn by horses over the railed streets, and these have made way, in turn, to the car propelled by electricity, compressed air or other mechanical power. The streets have become congested with the rapidly growing vehicular traffic despite the development which is displacing the horse and introducing rapidly moving automobiles and auto-cars. Above the streets elevated railroads are constructed with rapidly moving trains propelled by steam or electricity, and underground roads are burrowing beneath the foundations of the street. Not only are the streets being threaded by electric railways, not only are overhead and underground railroads being constructed, but, in cases, the streets themselves are elevated, and one lies immediately above another. With the railways and other routes of transportation focused in the heart of the city, there is here a density of traffic and a congestion of means of transportation which necessitate, in many cases, the restriction of such territory to certain classes of traffic.

The foregoing sketch is in no sense a complete description of the transportation systems of large cities, but is simply intended to show, in a very general way, the complexity of the problem of urban transportation, and the large number of transportation agencies by which this vast movement is affected. There is one agency, however, which is far-reaching in its importance, but which is frequently disregarded and usually not included under the means of urban transportation, owing to the fact that the compensation for this service is not made by direct payment. The horizontal transportation of persons from one part of a city to another, however, finds its counterpart and its complement in the vertical transportation by the elevator from one part of a building to another. The construction and operation of rapidly moving elevators permit an increase in the height of buildings in the central parts of the city, and effect a concentration of the industrial population in much the same way as does the electric railway in horizontal or lateral transportation. Thus the influence of elevators in effecting changes in the values of urban real estate is similar in kind, if smaller in degree, to that exerted by improved street railway facilities. The elevator represents the last stage in the development of rapid transit in great cities, and does its part in the abridgment of distance between the place of work and the place of residence.

The rapidity with which these changes in the transportation of persons have taken place, and the immense development which has already occurred, should not lead us to the conclusion that this development has reached its final stage. This development in city traffic has taken place chiefly during the last fifteen years, the progress during that time being greater than during the century preceding. It is possible, however, that we are only in the beginning of a vast change, and the development is so rapid that it is rash to set limits to its further progress. The wonderful growth in electric railway traction in the past may not prevent a further change in motive power, which may make our present means of locomotion appear clumsy and archaic.

The rapidity with which bicycles have been introduced, and the remarkable series of technical improvements which have facilitated their general use, naturally lead one to anticipate a similar evolution in the construction of horseless carriages or of cars propelled by mechanical power; and such development can hardly take place without an increase in the present tendency toward the improvement of streets and roads. The time appears to be growing less remote when horses will be banished from great cities almost as completely as have other animals, and it is not safe to set limits to the possible development of means of transportation of persons in great cities, or to the changes which may be effected by such improvements. In another part of this book the problems connected with urban transportation have been dealt with at some length; at present, therefore, I shall limit my discussion to the transportation of persons by steam and street railways.

There are certain differences between the transportation of persons and that of things which are so fundamental and obvious that they are frequently overlooked, and these conditions, which arise from the very nature of things, necessarily result in the adoption of varying policies for passenger and for freight traffic.

As a general statement, it may be said that passengers are self-directive, while freight is not; that, in other words, the movement of persons is voluntary. There are, of course, exceptions to this rule. The transportation of children, slaves, soldiers, contract laborers, convicts, paupers, etc., may be effected, not at their own instance, but at that of other persons; but the great mass of passengers travel of their own volition. In the case of persons, therefore, a change of place may be either a means to an end or the end itself, while in the case of freight the transportation can be only a means to an end. Passengers on board a transatlantic liner may be actuated by a desire to see Europe, or simply by the pleasure of the ocean trip. The distinction between these two classes of travelers is important, especially in view of the fact that it is a remunerative and successful policy to appeal to these two classes separately. The value of the trip to the person who travels as a means to an end is inversely rather than directly in proportion to its length or duration, while in the case of the passenger to whom travel is the end itself the advantage is almost directly in this proportion. The proprietors of street railways in many American cities have recognized the value of appealing to this latter class, as is evidenced by their successful attempts to make electric railway travel pleasurable, and by the great traffic which has grown up, especially on summer evenings, and on open cars. An analogy in the case of steam railroads is not difficult to find.

Another result of the self-directive, or voluntary, movement of persons is to be found in the manner in which passenger fares are made as distinguished from freight rates. In the case of a passenger there is no necessity of loading or unloading on the part of the railroad, this naturally being done by the passenger himself. In consequence, while there are certain terminal expenses in the passenger traffic, resulting from the construction of expensive stations in central locations, these expenses are constant and do not increase appreciably with the traffic. In the case of freight, however, the chief expense is frequently that of loading and unloading, and the rates per mile for this traffic consequently diminish with the number of miles, the terminal charges being constant and independent of the distance moved. Much of the reduction in freight rates has been due to improved methods and appliances for loading and unloading freight, a development for which there is no scope in the passenger traffic.

The passenger traffic also differs from the freight traffic in the fact that passengers are animate beings, and, having feelings which must be regarded, require safety, comfort and speed in their transportation. There are certain kinds of freight, notably milk, fresh fruits, and other perishable commodities, which require speed in transportation, while the transportation of animals, which should be included under the general head of freight, makes requirements similar to those necessitated by the transportation of persons. In some respects it may even be said that accommodations for passengers in the fourth-class compartments in railways of certain Continental countries are but little superior to those afforded to cattle; and it is a well-known fact that many persons desiring to go to Europe prefer to travel by the cattle boats, owing to the fact that, in one respect at least, namely, in the comparative absence of the rolling of the vessel, the cattle are better and more comfortably provided for than are human passengers. Both in rail and in water transportation it has been found remunerative to convey cattle under conditions which give them a certain amount of safety, and which preserve their health and weight.

The general truth of the statement, however, cannot be gainsaid that the demands made upon the railroad by passengers as regards comfort, and, consequently, space, and as regards speed and safety, are immensely greater than those demanded by freight. The speed required by the passenger necessitates a considerable expense for motive power, and safety under such conditions involves a vast expenditure of money. The requirements of comfort, however, are the most exacting and the most costly of all. It is not possible to fill a car with passengers in the manner in which it is loaded with coal or iron, and under the most favorable circumstances the amount of dead weight is much greater in the case of passengers than in that of freight. This general question is treated at greater length in the chapter on the Utilization of Rolling Stock, but at present it is sufficient to point out that there is, on an average, a larger amount of dead weight carried per passenger (weighing less than 150 pounds) than is carried per ton of freight. The natural effect of these requirements of safety, speed and comfort is found in higher fares charged for passengers.

A further difference between passenger and freight traffic arises from the fact that, roughly speaking, freight is transported in order to be destroyed in production or consumption. In consequence, as a general rule, each individual ton of freight moves in one direction only, while each passenger moves in two. Coals are not shipped to Newcastle after being sent from that city, but in the case of the passenger traffic those who leave a place return to it. This is not only true of individual shipments, but of the total amount of traffic, the bulk of the freight traffic being almost invariably in one direction, namely, from the less populous to the more populous regions, while the movement of passengers is reciprocal, and the movement both ways balances itself. This difference has its effect in the utilization of rolling stock. Its effect is also seen in the fact that the passenger fares are usually as great in one direction as in the other, while in the freight traffic the rates are usually lower in the direction of least movement.

Perhaps, however, the most fundamental of these differences between the passenger and the freight traffic lies in the fact that in the former the object conveyed is self-directive. In the vast majority of cases the passenger himself determines where, when and how he is to travel, and is not put on board at the direction of the railway company or of some one else, as a bale of cotton or a ton of coal is loaded. There is, in consequence, no cost of loading or unloading. The passenger enters and leaves the car, and enters and leaves the station, without the assistance of the railway company, and the cost of loading and unloading, which in many articles of bulk forms a considerable portion of the total cost, is thus obviated in the passenger traffic.

It does not follow from what has just been said, however, that there are no terminal or station costs in the passenger traffic. This is the case in street railway traffic, where the passenger boards and leaves the car in the open street, but the steam railways have been obliged to construct very expensive, and often luxurious, passenger stations in the central portion of the city. In consequence, the principle of a smaller cost per mile for the long than for the short travel has an application, though a limited one, in the passenger traffic, and the cost of the stations and the fear of overcrowding them sometimes enter as a factor in preventing the railway from reducing fares for very short trips. In general, however, it may be stated that in the freight traffic the terminal and in the passenger traffic the haulage charges are determinant. In the passenger traffic the absence of charges for loading and unloading reduces the terminal charges, while the freedom of movement of the travelers and the demands of comfort, speed and safety render the charges *en route* greater. The chief factor in the cost of the passenger traffic is the emptiness of the train. In 1896, the average freight train on the railways of the United States hauled, throughout the whole trip, 198.81 tons of paying freight; the average passenger train carried 39 passengers, or less than 3 net tons[1] of humanity. The capacity of a passenger train may, of course, be greatly increased, and in countries like India and Japan we find the railways carrying five times this number of persons, but even where men are hauled on the same principle as are the lower animals the number of passengers is small, and the demands of comfort, safety and speed have the effect, firstly, of increasing the cost per train mile, and, secondly, of reducing the number of persons among whom cost may be divided.

Another element which is often thought to diminish the number of passengers per train is the minute division into classes. The European railways have, usually, besides palace cars, three or four classes of cars into which the travelers are divided, and while the third and fourth classes may be well filled, the first and second class compartments are usually empty. It is true that in the freight traffic a similar division is made of freight into classes, according to bulk, value and destructibility, but in the case of freight the division is made by the railway company itself, while each passenger may determine for himself in what compartment he shall travel. This renders the problem of filling the cars still more difficult, although in many cases the probable traffic for each class can be foreseen with a considerable approach to accuracy. The division of traffic, moreover, into local and through, and into express and accommodation, prevents, to a certain extent, the depletion of the passenger trains, and the running of excursion trains further allows the companies to obtain full trains. The fact, however, that passengers cannot be kept waiting at stations, decreases the terminal and increases the haulage charges; the demands of comfort also affect the haulage more than the terminal costs, while the requirements of speed likewise tell chiefly on the costs of actual transportation. It

[1] This is on the assumption that the average passenger weighs 150 pounds.

may be stated, therefore, though in a general way and with limitations, that in the freight traffic the terminal charges, in the carriage of persons, the train charges, are determinant, and this difference affects profoundly the problems of the passenger traffic.

Another fundamental characteristic which distinguishes the passenger from the freight traffic (and which has already been emphasized) is its equilibrium. The passenger traffic is a movement to and fro, forward and backward. The same persons who leave by rail return by rail, and there is a balance between in-going and out-going traffic, between travel in one direction and travel in the opposite direction.

In the transportation of things, on the other hand, matter is moved from where it is not needed to where it is needed. It may never return, or, if it does, it may do so in another form and by other than human agencies. The railroad carries the wheat from the field, but it is not returned by the railroad. Nor does it carry to the farm or the farmer an amount of material at all comparable in weight or bulk to the agricultural produce which it has carried away. The soil recovers the lost elements through a series of natural processes, but the railway plays only the smallest part in this return.

In consequence, freight traffic is predominatingly in one direction. In America the bulk of the traffic is eastward; in Europe westward. Broadly speaking, the freight traffic of the world, whether by sea, road or railway, is toward the great complex of populous nations in western Europe, whether the direction thereto be north or south, east or west. The traffic moves from the sparse to the dense population, from the agricultural regions to the industrial centres. On a smaller scale, though in a still more distinct manner, traffic moves from the country to the city. What is brought to the city by the railroad leaves through the furnace and the sewer. The millions of tons of coal which the railways bring to Paris, London and New York are burned, and leave the city chiefly through the atmosphere.

The movement of persons, however, is reciprocal. Whoever leaves is sure to return, and whoever travels north again travels south. There are, of course, large migrations, vast displacements in society. The Old peoples the New ; the path of settlement takes its course westward, and millions of Europeans leave their native soil to find homes in the West. Vast as is this migration, however, it is insignificant when compared with the immensely greater movement to and fro, and a comparison may be made, without undue exaggeration, between the molecular movement within a stable body and the movement of persons within a given country.

This reciprocal movement of persons may be shown by many examples. Thus, if we analyze the eastward and westward traffic on the Lake Shore and Michigan Southern Railway during the twenty-five years ending 1894, we find that while during every year (with the single exception of the year of the Chicago Exposition, 1893) the west-bound traffic was greater than the east-bound, this excess was so slight as to make the number of west-bound travelers exceed the number of east-bound passengers by only 2.2 per cent. This slight excess of the number of west-bound travelers is extremely significant. It shows not only the extent to which the two directions of traffic balance each other, but the effect as well of the wave of westward migration that has swept through the United States. It is interesting as showing not only to how small an extent this wave has affected the equilibrium set up by the two currents of travel, but also, in later years, the decreasing influence of this disturbing cause through the normal increase in the whole body of traffic, and the diminution in the volume of population displacements. While, as has been said before, the west-bound traffic preponderated slightly during every year except 1893, the excess of the west-bound traffic was 5.2 per cent in the first quinquennial period (1870–74), as compared with 2.1 per cent, 3.3 per cent, 1.3 per cent, and 0.4 per cent in the subsequent quinquennial periods. The following table,[1] calculated from the returns of the company, shows this development with great clearness:

LAKE SHORE AND MICHIGAN RAILWAY—MOVEMENT OF PASSENGERS.

Period.	Eastward.	Westward.	Excess of Westward.	Per cent of Excess.
1870–74	5,953,878	6,312,170	358,292	5.2
1875–79	7,224,098	7,376,507	152,409	2.1
1880–84	9,176,288	9,476,587	300,299	3.3
1885–89	9,641,562	9,771,356	129,794	1.3
1890–94	13,241,444	13,288,211	46,767	0.4
1870–94	45,237,270	46,224,831	987,561	2.2

Still another factor of importance to a consideration of the passenger traffic is the variation in the amount of passenger traffic during different months of the year. As a rule, the greatest amount of traffic and the largest amount of revenue upon the railways are obtained during the summer months. Thus, on the Austrian state railways the total revenue received during 1897 for each of the summer and autumn months, June, July, August, September, October and November, was above the average, while the revenue for each of the winter and spring months was below the monthly average of the year. The revenue on Austrian railways reaches its lowest point in February, and it steadily increases until September and declines again to February.

The variation in the bulk of the traffic, and in the revenue from this traffic, is far greater for the passenger than for the freight, or for the total business. The total revenue from all traffic for September, the month of greatest traffic (9,072,651 florins), was only 41 per cent larger than for February, the month of feeblest traffic (6,960,913 florins). The freight receipts for November (7,367,153 florins) were but 30 per cent greater than the freight receipts for February; but the difference between the passenger revenues for the month of greatest and the month of feeblest traffic was 151 per cent (1,308,159 florins in February, 3,279,848 florins in August). For every $100 of passenger receipts in February there were $250 of passenger revenue in September, and while in some months less than one-fifth of all revenue was due to the passenger business, in other months over one-third was derived from that source. During the months of June, July, August and September passenger receipts are above the monthly average, especially during the holiday months of July and August; in April, May and October the revenues were slightly below the average (from 4 to 6 per cent), and during the winter months they fell to from 23 to over 40 per cent below the average monthly revenue.

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[1] "Lake Shore and Michigan Railway Report, 1894," page 34.

A similar tendency is observable in most other countries, but it is not necessary to cite many examples. Thus in the Netherlands, for example, the passenger traffic on the Holland Railway Company[1] for 1897 was found to increase steadily from February to August, and then to decline rapidly, and with considerable regularity. The fluctuation in the passenger traffic is here also much greater than in the freight traffic. In October there were 69 per cent more tons handled than in June, but between the month of feeblest and of most intense passenger traffic there was a difference of 114 per cent in the number of passengers and of 116 per cent in the passenger receipts. The greatest proportional increase in summer traffic is to be found here among the second-class passengers, the excess in the number of passengers traveling in August over those traveling in February being 90 per cent in the first-class, 91 per cent in the third-class, and 206 per cent in the second-class. While the number of passengers is less than doubled in the first and third, it is more than trebled in the second-class.

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[1] "Hollandsche Ijzeren Spoorweg Maatschappij. Verslag over het dienstjaar," 1897. Appendix C.

On the United Swiss Railways,[1] while the traffic is feeblest in February and becomes more intense during the summer, the highest point in the number of passengers is reached sooner than in most other countries, the months of most intense traffic being July, May and August.

The number of travelers is but 70 per cent greater in July than in February, but owing to the longer distance traveled and the shifting to higher classes, the passenger receipts for July, 1897, were 131 per cent, and for August 141 per cent greater than in February of the same year. On the Prussian state railways,[2] the passenger traffic increases rapidly from February to August, the greatest number of trips being taken in August, though the greater average distance traveled in July during the holiday season causes the total mileage traveled and the total receipts from passengers and baggage to be still greater than in August. During the year from April 1, 1896, to March 31, 1897, the number of passengers in August was 21 per cent greater than the monthly average, and 58 per cent greater than for February; the total number of miles traveled by all passengers in July was 35 per cent greater than the monthly average and 102 per cent greater than that of February, while the total revenue from passengers and baggage for July was 37 per cent above the monthly average and 110 per cent above the February revenue from the same source.

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[1] "Vereinigte Schweizerbahnen (Union Suisse). Einundvierzigster Rechenschaftsbericht an die . . . Generalversammlung St. Gallen," 1898. Tabelle 3.

[2] "Die königlichen preussischen Staatseisenbahnen im Jahre 1896–97." *Archiv für Eisenbahnwesen*, 1898, pp. 306–342.

As may be seen from the examples given above, the great cause of the fluctuation in the passenger traffic is due to the custom of granting holidays in the summer and to the inclemency of the American and European winter, which, as a rule, causes travel to be largely avoided during that season. The main increase in the bulk of traffic is to be noted in the long-distance traffic, the coldness and general discomfort of winter traveling acting to a much less extent as a deterrent for short-distance than for long-distance traveling. Much of the long-distance travel occurs during the summer months, owing to the fact that during this time the general public has a short vacation, without which long-distance traveling would hardly be possible.

For city and suburban travel, the latter element of spare time does not appear, and for railways ministering to this traffic the fluctuations in the amount of travel will consequently be less than in those in which there is a long-distance traffic. Thus on the Berlin City[1] Railway (Berlin Stadtbahn) the number of passengers was only 23 per cent greater for the month of densest traffic in 1897 (May) than for the month of feeblest traffic; and in 1893, 1894, 1895 and 1896, the number of passengers carried in the month of greatest traffic was but 39 per cent, 42 per cent, 32 per cent and 35 per cent higher respectively than that in the month of feeblest traffic. Not only are the fluctuations not so great as in the case of railways serving a holiday traffic, but the month of the greatest amount of travel is not July and August, the month of vacations, but rather May. During the fourteen years from 1884 to 1897, the month of greatest traffic on the Berlin City Railway has been ten times May, twice October, once June and once August. The effect of the winter weather as a deterrent to travel is to be noted, however, even on city and suburban lines. During every one of the fourteen years, February has been the month of feeblest traffic on the City Railway, and with two exceptions, when the January traffic was still smaller, the period of feeblest traffic on the Circular (Ringbahn) or suburban railway has also been February. Thus even on a city or suburban railway the winter prevents the normal amount of traveling and acts as a deterrent to movement. During the fourteen years mentioned, the May traffic was invariably (fourteen times) above the monthly average ; June, July and September thirteen times ; April, August and October twelve times ; December three ; November twice, and March twice above the monthly average.[1]

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[1] The complete statistics for the fourteen years from 1884 to 1897 are reproduced in the *Archiv für Eisenbahnwesen*. Der innere Personenverkehr der Berliner Stadt- und Ringeisenbahn," 1898,pp. 867–905.

The winter does not seem to have any effect upon the comparative use of the second- and third-class compartments on this railroad. Similar seasonal fluctuations might be shown on railways in other countries, but the above instances are sufficient to show general tendencies.

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[1] In 1894, the March traffic was something over the average, owing to Easter falling in that month.

CHAPTER IV.

THE GENESIS OF RAILWAY TRAVEL.

In the minds of the present generation, traveling by land is inseparably associated with the railway. The revolution of travel, since the advent of this means of conveyance, has been so radical and complete as to cause us to lose sight of the progress in traveling which had preceded it. There existed, however, in the early part of this century, a very considerable movement of persons, which the improvement in the roads, vehicles and breed of horses had rendered possible. The calculation by Porter[1] of a stage-coach traffic in England, aggregating 358,000,000 passenger miles for the year 1834 (though perhaps slightly exaggerated), shows that at the period of the inception of the railway the transportation of persons by means of stage-coaches had already made considerable advances.

It is not necessary, however, to retrace this pre-railway traveling to ancient times, as the movement of persons did not exist on a scale at all commensurate with that of 1834 until within quite a recent period, and as this development was both late and rapid.

The development of primitive traveling forms an interesting chapter in the history of mankind. The evolution of the road, the domestication and use of the horse, camel, elephant, reindeer, and other animals, and the gradual improvement in the conveyance or vehicle, are not in themselves uninteresting or unworthy of study; but they are too far removed from the subject of railway transportation to warrant consideration in this connection.

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[1] "Progress of the Nation," p. 300.

Until the latter part of the eighteenth century traveling by land was an exceedingly rare, costly, slow, arduous and dangerous pursuit. The political conditions of the Middle Ages had not been favorable to the security of traveling, and roads had not been constructed to any considerable extent during this whole period. For centuries the roads of Great Britain were little more than tortuous and narrow foot-paths, which rendered traveling, even on horse-back, uncomfortable and precarious. It was not until the middle of the sixteenth century, during the reign of Mary, that the roads were subjected to anything like legislative control, being then turned over to the control of the parishes. Six days of labor were demanded from the peasant, and additional labor was paid for out of the parochial rates.[1] But while this arrangement was better than no system at all, it did not materially promote the development and improvement of roads. The burden of the maintenance of the road fell upon the poor rural districts, through which it ran, instead of upon the richer terminal cities which profited by it, and improvements in one section were discouraged by bad conditions prevailing elsewhere on the same road. An attempt in the latter half of the seventeenth century, during the reign of Charles II. (15 Car., II c.),[2] to institute national turnpike roads was shattered by the opposition of the people, and it was not until 1763 that "turnpike-gates were first established in all parts of England."[3]

At the time of the Restoration, stage-coaches were still a novelty in England. By 1662 there were but six stage-coaches in the country, and some held this number to be six too many. The diligence between London and Oxford made the distance in two days, and it was considered a great feat and a daring innovation when, in 1669, the attempt was successfully made[1] to perform the whole trip between these cities between the hours of six o'clock in the morning and seven in the evening. The success of the venture led to similar efforts on the part of the rival university town of Cambridge, and stage-coaches sprang up in various parts of the country. As late as 1685, however, there appears to have been no stage-coach or stage-wagon going farther north from London than York, or farther west than Exeter.

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[1] Francis' "History of the English Railway," p. 9.

[2] Macaulay, "History of England," Vol. I, p. 342.

[3] "Francis," *op. cit.*, 23.

The most notable improvement in stage-coach travel from the middle of the seventeenth to the middle of the nineteenth century was in the direction of an acceleration in speed. With the development of industry the necessity of rapid intercourse between cities increased, and with the need came improved means of transportation. The roads were bettered, coaches provided with a series of relays, and economy of time was observed as far as compatible with safety. In fact, the saving of time was frequently regarded even to the exclusion of this consideration. The competition of rival companies caused them to obtain the best horses for the stages (horses being especially bred for this service), and the drivers were compelled, under penalty, to arrive at the time specified. Relays were frequent; the change of horses took place very rapidly, and the steeds were frequently so overdriven as to cause them to die in harness. The effect, however, was a very considerable increase in the speed of the traffic.

Despite this increase in speed, however, the chief cause of the small coach traffic remained its comparative slowness, although this was due less to the pace at which the coach traveled while in motion than to the frequent interruptions to which the travelers were exposed. In England the ordinary flying coach made about fifty miles a day in summer and thirty miles in winter.[1] In France, at the same period, an average daily journey of eight or nine leagues was considered quite satisfactory, and while this increased greatly by the end of the eighteenth century, the traffic was here, as elsewhere, open to considerable interruptions. After sunset traffic was practically suspended, and during the day itself the interruptions were frequent and extended. The coach stopped for dinner, and it is claimed that the gentlemen were never hurried, if the desire to dine wisely and well necessitated a short interruption of the journey; nor was it considered unreasonable to stop the coach for a few minutes to allow a passenger to conduct his business or to pay a morning call.

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[1] "Macaulay," *op. cit.*, pp. 342–3.

Where traveling was so slow and conducted under such great disadvantages, it may well be thought that it could not attain great proportions. Another factor that tended to restrict its volume was the great expense it involved. The cost of transportation by land was so high that for a long time none but the very rich could indulge in this form of travel. At the end of the seventeenth century the charge on the public coaches (*carrosses publics*) from Paris to Dijon amounted to 12½ centimes per kilometer, which changed to the values now existing would amount to about 12½ cents per mile,[2] while the journeys from Paris to Versailles, or from Paris to St. Germain, were still more expensive. One hundred years later, during the reign of Louis XVI., the price of transportation on the stage-coaches (diligences) was 20 centimes per kilometer, but the metallic consistency of the "livre" had been reduced, and the fares measured in the money of to-day were about the same as in the seventeenth century, or about 12½ cents per mile. Fifty years later, in

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[1] "But this speed, which seems so inconsiderable at present, appeared to the Englishmen of that day as extremely and dangerously rapid, and in a book published in 1685 the flying coaches of England are praised as being the most rapid in the world." Macaulay, *op. cit.*, 344.

[2] de Foville, p. 25.

1830, the rate for the more rapid mail-coaches was somewhat lower than the charge for the stage-coaches had been, the subjects of Louis Phillipe paying about 75 centimes per league for the more rapid transportation. The price of places on the mail-coaches was finally regulated on the twenty-fifth of December, 1839, at 1.75 francs per myriameter (6.21 miles); or, assuming the value of money to have remained unchanged, at 5½ cents per mile. From a little pamphlet published in 1775, and entitled "Itinéraire des routes les plus fréquentées, ou Journal d'un voyage aux villes principales de l'Europe,"[1] it is easy to see some of the elements of this high cost of traveling. The rate for which horses can be obtained is given for England, Piedmont, Genoa, Parma, Tuscany and the Papal States, Naples, Venice, Milan, Geneva and Switzerland, Savoy, Germany, Holland and the Pass of Mount Cenis. These prices do not differ very materially. For England, they are 9 pence per mile for two mail-coach horses, 15 pence for four mail-coach horses, 3 pence per mile for a saddle-horse, and it is customary to give 18 pence or 2 shillings to each postilion and 6 pence to the groom. The expenses of traveling, however, were swelled far beyond these charges by the requirements of comfort and style and by the easy and slow progress made. Thus, an Englishman named Thomas Martyn, publishing a traveler's guide to Italy in 1791,[2] estimated 780 livres as the cost of traveling by mail-coach from Paris to Calais, and 3,000 livres for traveling from Calais to Nice, but did not state how many were in the party or what expenses this total included. As late as 1840, it cost a single person traveling in a separate carriage (cabriolet), with two horses and a postilion, 17½ cents per mile, and for a group of six persons the minimum charge was about 6¼ cents per mile per person.

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[1] de Foville, pp. 27–29.

[2] de Foville, p. 30.

The cost of traveling by stage-coach, however, was cheaper than by mail-coach. The large stage-coach was divided into three parts, the outside or "rotonde," and two inside compartments, the "coupé" and the "intérieur." The coupé on the routes from Paris to Geneva, Lyons, Toulouse and Bordeaux ranged from 4.5 to 5.6 cents per mile, the "intérieur" from 3.9 to 4.7 cents per mile, and the "rotonde" from 2.5 to 3.9 cents per mile.

It is quite impossible to estimate exactly the amount of traveling under this system, but it may be assumed that until the present century it was, outside of England, exceedingly small. The English already were the greatest travelers. The anonymous author of the little pamphlet already mentioned[1] stated that in 1775 "the English alone travel more than all other nations together." This preponderance of the English in traveling was due to a number of causes. At the beginning of the railway era, the population of the United Kingdom, and above all of England, possessed a considerable mobility and traveled to a considerably greater extent than did the inhabitants of other countries. During the latter part of the eighteenth century great progress had been made in the art of constructing roads, and during the early part of the nineteenth century the improvements made by MacAdam and others had led to an increase in the number and an amelioration of the condition of the roads, so that during the years 1818 to 1829 there were over 1,000 miles of turnpike road built in England and Wales alone.[2] The imperfections of the roads, which were so apparent in the days of Arthur Young, and which called for such highly superlative denunciation from that apostle of exaggeration, had for the most part vanished by the early thirties, and a contemporaneous improvement took place in "the form of construction of our public carriages and in everything connected with their management and performance."[1] The result was an increase in the amount and speed of travel. The journey from London to Oxford, which in 1742 required from 7 a. m. in one day until the evening of the next day, was regularly accomplished in the fourth decade of the present century in six hours, and while the "fast coach" from Gosport to Charing Cross (80 miles) required nineteen hours in 1798, the "record" had in the course of about thirty-five years been reduced to eight hours. In 1837, the average speed of the mail-coaches was about 8⅞ miles per hour, and in some cases the speed attained to 10⅝ miles, certainly a very creditable record for coaches drawn by horses. This increased speed, moreover, was fortunately accompanied by an enhanced immunity from accidents, the improved harness, the more skillfully constructed coaches, the better conditions of the roads, and the greater intelligence, sobriety and general respectability of the drivers contributing to this result.

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[1] "Itinéraire des routes les plus fréquentées," 1775. de Foville, p. 29.

[2] Porter, G. R., "The Progress of the Nation." London, 1836, Vol. II, p. 7.

By 1837 there were 54 four-horse and 49 two-horse mail-coaches in England (30 in Ireland and 10 in Scotland), while the whole number of stage-coaches (including mails) licensed by the Commissioner of Stamps was 3,026. The capacity of these coaches, as seen from the number of journeys they were licensed to make and the number of travelers they were allowed to carry, equaled (according to an estimate of Porter's) a carriage of 597,159,420 persons one mile. From observation in special cases, however, Mr. Porter comes to the conclusion that this carrying capacity is used to about three-fifths or, in other words, that on an average, day in and day out, and on all roads, there would be two empty seats for three filled ones, and, according to this approximation, the work annually done by the coaches amounted, in his opinion, to the carriage of 358,295,652 persons one mile. If we estimate the population of England at this time at 14,500,000, it could be seen that, on an average, each inhabitant of England traveled 25 miles per year by coach.

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[1] Porter, *op. cit.*, Vol. II, p. 17.

Mr. Porter (pp. 21, 22) assumed, however, that only 2,000,000 persons used the coaches, which makes an average of 180 miles per person, traveling.

The following table shows the acceleration of traveling in France, by stage and mail coach, from the middle of the seventeenth century to 1834, and a comparison with the speed obtained by rail at present:

SPEED OF STAGE-COACHES IN FRANCE.

From Paris to	Distance.	Length of Trip in Hours at Different Periods.					
		Stage-Coach, 1650.	Stage-Coach, 1782.	Mail-Coach, 1814.	Mail-Coach, 1834.	Railway, 1897.	
	Miles.	Hours.	Hours.	Hours.	Hours.	Hours.	Min.
Calais	183	123	60	40	28	3	42
Lille	153	105	42	34	22	3	15
Mézières	. .	110	40	34	22	.	.
Forbach	. .	171	93	55	38	.	.
Strassburg	313	218	108	70	47	7	20
Belfort	275	182	98	59	39	6	50
Besancon	. .	166	92	57	37	.	.
Geneva	389	245	158	75	48	10	22
Nice	676	438	221	140	98	16	20
Marseilles	536	359	184	112	80	12	.
Montpellier	. .	356	193	112	77	.	.
Toulouse	443	330	198	104	70	12	05
Bayonne	486	358	200	116	64	11	.
La Rochelle	290	227	108	72	41	9	06
Nantes	265	172	90	56	37	7	23
Brest	386	270	175	87	61	11	14
Havre	140	97	52	31	17	3	15

CHAPTER V.

INCENTIVES TO TRAVEL AND THE THEORY OF PASSENGER FARES.

One of the most difficult of the problems presented to the practical railway man is that of calcualting the probable demand for travel or transportation along a newly constructed or recently extended line. It is comparatively easy to determine in advance at what cost a given amount of freight and a certain number of passengers may profitably be handled, but it is a problem bristling with unknown quantities to determine what freight and what passenger traffic may be attracted at a given rate.

In the passenger, as in the freight, traffic the amount of new business that will probably be obtained by a change in the policy of the railroad (whether it be an extension or improvement of the service, or a reduction of rates) is usually more or less accurately arrived at by rule of thumb or by a rude, and often unconscious, generalization from the experience of other roads. It is remarkable to what an extent these generalizations prove satisfactory, at least within certain broad limits, especially as the problem is complicated by so many factors of purely local origin.

It is impossible, in a general treatise, to lay down rules which will guide a railway manager or general passenger agent in the solution of the practical problems which arise from the local conditions which he is to serve. The fluctuations in an anticipated traffic may be due to the most recondite causes. Thus, the passenger traffic on Indian railways was less in 1897 than in 1896, owing, among other causes, "to the restricted movement of pilgrims and marriage parties, as the early part of 1896 was considered an exceptionally auspicious period for such events."[1] Causes of so purely local a nature, while not to be disregarded by the railway company serving the district, cannot be taken into account in any general treatment of the subject. The present discussion is nothing more than a statement of the chief calculable motives which lead to traveling and those which deter from it, the influence of this demand upon the conditions of travel, and conversely of these conditions upon the demand for travel.

The improved railway facilities have been the effect, but have also been, and still are, the cause of a vastly increased and intensified demand for travel. As the cost of the transportation of freight now makes up a greater proportion of the price of articles than ever before, despite the decline in the cost of transportation, so has the time and money spent in the movement of persons increased vastly, despite the diminution in the price and the lessening of the time required for a single unit of movement. The dependence of people upon transportation agencies has become greater and greater. Whether or not the average man of to-day walks more or less than his father or grandfather may be open to question, but it cannot for a moment be doubted that he walks far less in proportion to the total amount of his travel. The increased locomotion is principally, though not entirely, due to the steam and street railways. Transportation by water plays an important part in the conveyance of persons, and horses and other domesticated animals are used for riding and driving, while bicycles, automobiles, etc., are largely used in such movement. It is chiefly to the steam railway and to the city or street railway, however, that the increased transportation is due, and it is to these, and chiefly to the former, that the present chapter refers.

The necessity under which a railway is placed to observe the wishes of its patrons renders a study of the motives which lead to traveling, and the causes which hinder traveling, of considerable moment. Such motives are numerous. There is scarcely a feeling of which humanity is capable, scarcely a condition in which man can be placed, that may not, in given cases, result in the use of the passenger cars. Of all possible motives, however, we need consider only those which are sufciently potent and universal to influence the management of the passenger traffic. The fugitive from justice may immediately think of the railroad as a means of escape, but it would be as inadvisable to place the resulting travel in a class by itself as it would be for the railroads to offer such prospective travelers special inducements. On the other hand, the desire to use the cars for a summer holiday is so general and so capable of statistical measurement that traffic arising therefrom may be differentiated from the rest and studied separately.

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[1] Vol. II, p. 86, "Administration Report on the Railways of India for 1897–8." Calcutta, 1898.

As it is to the interest of the railways, therefore, to stimulate traffic to the utmost profitable limit, the purpose of the railroad will best be subserved when the factors which induce travel are accurately known and intelligently considered. Other things remaining equal, the more varied the motives to which the railways can appeal, the greater will be the susceptibility to stimulation, but such stimulation, if successful, must be intelligently applied and with due knowledge of the motives of the probable patrons of the lines. Thus, in a country where the population is wealthy but sparse, a reduction in fares will not have the effect of commensurately increasing the traffic, and will usually be far less effective than an increase in speed or an improvement in the service. The more wealthy the population the greater is the effect of an acceleration of speed, and the less of a decline in the fares. The fourth-class cars in Prussia attract a great rural traffic, since wages are so small as to make the saving effected of sufficient importance to counterbalance the resulting discomfort and the loss of time, but the introduction of a similar service, even at the same price, in Pennsylvania, Illinois or California would be injudicious if not suicidal. Long-distance traffic is, as a rule, not so susceptible of stimulation as short-distance travel, but the business travel of suburban districts is immensely susceptible of increase. The same may be said of the traffic within a city itself, but there is a considerable difference in the manner in which, and the extent to which, city and suburban traffic may each be stimulated. The season of the year renders different forms of travel more or less susceptible of stimulation, and the character of the stimulant differs with the character of the classes affected, their wealth, intelligence, leisure, prejudices, customs, etc. Different classes of the population, and the same class at different times, and under different conditions, will be more or less likely to use the railway and more or less prone to increase their use by better service or cheaper fares.

In popular speech traveling is spoken of as "on business," or "for pleasure." This distinction is not very sharp nor are the terms mutually exclusive, but it may serve as a basis for a more exact classification. The inducements to travel may be classed as economic and non-economic, and these two classes may be further subdivided. It is a matter of universal knowledge that railroad traveling is often due to the desire to make a permanent change in residence. Never, in the history of mankind, have such displacements of multitudes been witnessed as during the present century. The economic causes of emigration and colonization need not be here discussed, but a few figures will give an idea of the immense proportions attained by these movements. Since 1820, over nineteen millions of immigrants have arrived on our shores, and of this number a large proportion have been carried by the railroads to the interior of the country, while railways and steamships have co-operated in effecting similar migrations in other parts of the world. The movement of the resident population within a given country is also considerable. The great movement toward the Western States was largely effected through the agency of the railroads, and the trend of population from the country to the city might properly be considered in this connection. Much of this migration, especially from one country to another, however, may be accounted for by political and social reasons, as well as by economic causes. In comparison with other forms of traffic, moreover, the traffic due to a desire for a permanent change in residence is quite small, and in all probability will in the future become of relatively less importance in this country.

A motive, closely allied to that just treated, is the desire to obtain a temporary residence and employment in another country, or part of the same country. The limitations placed upon labor by the seasons make temporary migrations of workers profitable. The movement of French Canadians to and from New England, or the migrations of laborers from Eastern Prussia to the west of Germany may be taken as instances. At present this traffic forms an inconsiderable portion of the whole bulk of passenger transportation, but the reduced fares sometimes accorded to such laborers imply that the business is not entirely disregarded. According to a well-informed writer on economics, Dr. Theodor Hertzka, the temporary migrations of labor might be wonderfully increased in comparatively undeveloped countries, such as Austria-Hungary, etc., by radical reductions in passenger fares. In his opinion freer movement of the laboring population would enable both it and the employing class to profit by the frequent changes in industrial conditions.

A large and increasing proportion of passenger transportation consists of transporting passengers from their residence to their place of business. Broadly speaking, this traveling may be said to be differentiated from the class which has just been considered, by the fact of its greater frequency and by the lessened length of the trip. Recently, however, by reason of increased speed, it has become quite practicable to carry passengers daily, for long distances, between their residence and their place of work. A large number of Philadelphia business men are daily carried to and from Atlantic City (almost sixty miles) during the whole of the summer, and a number of Baltimoreans daily travel to and from Washington, where they are employed, while a similar long-distance traffic has grown up in many other places. It is chiefly within the cities or their immediate environs, however, that such traffic has grown apace. The new methods of production are rapidly differentiating home from workshop, and the increase in population and the consequent rise in urban rents are removing the dwelling of the workingman ever farther from the place where he labors. The problem of rapid transit in large cities is becoming constantly more important, and the traffic on urban railways is growing more profitable and exacting. This movement is not exclusively due to the requirements of business (as the evening theatre traffic would testify), but the great congestion of traffic in the early morning and the late afternoon hours shows quite clearly the predominating character of the business portion of this travel. This frequent, short-distance traffic which is promoted by reduced rates, by workingman's and monthly tickets, etc., and which is divided between the steam and street railways, promises to become one of the chief sources of railroad income.

The extent to which the surburban traffic of a railroad may be stimulated depends largely upon the character of the population served. Where the suburb is composed of wealthy and "exclusive" residents, a reduction in fares is not, necessarily, a consideration to be desired. With suburbs of poorer people, however, the question becomes one of passenger fares *versus* rents. The fares should be so arranged as to make the cost of travel, plus the suburban rent, less than the rents in districts (within the city limits) which offer commensurate advantages. This is merely an adaptation of the theory of charging (on the basis of) what the traffic will bear. This policy of reduced rates for monthly or yearly tickets is often adopted without reducing the charge for single trips, especially where the ordinary traffic is not thought capable of great stimulation.

Allied to the passengers who travel to their place of business are those of whom it may be said, with approximate correctness, that traveling is their business. The commercial travelers, or "drummers," furnish quite a large quota to the railway revenues, though the exact proportion is probably not ascertainable. It is also somewhat problematical whether this sort of traveling is apt to increase very greatly. Commercial travelers have in the past contributed greatly to the rapid distribution of the product of large industries, but it is at least questionable whether the continued centralization of business and concentration of capital, as well as the extended use of telegraph and long-distance telephone, may not considerably diminish this large and lucrative business of the railways. At all events, it is improbable that further reductions in fare will greatly increase this category of traffic, as the railroad fares are small in proportion to the other costs of this travel (hotel charges, etc.), and still smaller when compared with the magnitude of the interests involved. Commercial travelers, however, have, by united action, obtained repeated concessions from the railroads.

As we have seen, much of the traveling is done in the pursuit of one's occupation, or with the definite object of bettering one's economic position. There are many other motives, however, that may induce travel. The desire to visit friends or relatives; the desire to see other countries, or other parts of one's own country; the wish to improve one's health by a change of air and surroundings; the desire for education, and, finally, the wish to seek rest and recreation by a temporary vacation, are all motives, not purely economic, which are of greater or less influence in inducing travel. The railroads have appealed to some of these motives with great success, but it may be said that, despite cheap excursion tickets and the like, railroads in general, and American railroads in particular, have failed to take full advantage of the potentialities of this traffic. In the beginning it was assumed, although tacitly, that traveling for the mere sake of traveling was not to be encouraged, and even to-day the pleasure jaunts of the poor are few by reason of their costliness. The beneficial effects of traveling for pleasure or rest can hardly be exaggerated, and, while the railways cannot reduce rates on all forms of traffic, it would seem possible to make more frequent reductions on special excursions than has hitherto been done.

The deterrents from travel are almost as numerous as the motives which lead to travel. Those deterrents, however, which are sufficiently general and potent to enter into the calculations of traffic or revenue, are few in number. The purely external deterrents, those, in other words, which arise from outside authority, are fewer and of less importance than in former times. In certain parts of the world, and for certain populations, the right to travel freely still remains ungranted, but in most countries this obstacle to free movement has ceased to exist. The right of expatriation and emigration is also being more universally acknowledged, though barriers have been placed in most countries to the immigration of certain classes of people. In consequence, it may be said that prohibitions placed upon travel, and particularly international travel, by legislative enactment are becoming less important. There are other factors, however, which deter from international travel, which are more permanent and fundamental. Differences in language, in customs and habits, as well as latent international hostility, set definite limits to this travel, although these obstacles are becoming less important with the improvements in the means of ministering to the comfort of the international traveler. Generally speaking, the chief deterrents to travel may arise from lack of money, time or inclination. Under the last head may be included all the factors which make traveling disagreeable or unsafe.

The factor of time is an important one in the passenger traffic. Few people realize the extent to which the passenger traffic is restricted by the smallness of the amount of leisure at the disposal of the great mass of the population. The difference between the week-day and Saturday and Sunday traffic emphasizes the importance of this consideration, while the rapid growth in the traffic during the holiday months of the year is another illustration of the effect which the limited leisure of the masses has upon the extent of their travel. The question of time sets a definite limit to the distance which it is practicable to live away from one's work, since while in American cities the street-car fare is usually the same whether the distance is eight miles or half a mile, the loss of leisure is so much greater in the former case that in many instances the ride will be surrendered and higher rents will be paid for houses nearer the place of business. In the steam railroad traffic, there is less reduction in fares on trips requiring a considerable expenditure of time than in those which can be had without much time being used. The greater the sacrifice in leisure, the greater the cost to the traveler both in the loss of wages and the cost of maintenance at the place to which he travels, the less will be the effect of any reduction in passenger fares, since these fares will make up but a small portion of his total expense. Railroad companies and administrations have recognized this fact and reductions in fares have been arranged on this principle.

The chief deterrent to travel is its dearness. The effect of reductions in fares in various countries has demonstrated how potent this deterrent is, and the shifting of the bulk of the traffic from the upper to the lower classes demonstrates at what a sacrifice of comfort, convenience and time, economy will be consulted by great masses of the population of all countries. The effect of these incentives to travel and deterrents therefrom is felt in every attempt to secure a rational basis for passenger fares.

Two principles are usually advocated for the determination of railway rates and fares—the principle of cost and the principle of value.

According to the principle of cost, railway charges should be based upon, and should be proportionate to, the actual cost of the service to the railroad. If it cost a railroad twice as much to haul a given article 400 miles as it does to haul the same commodity 100 miles, the charges should be twice as much, and the same would be true of the freight rates for different commodities. Thus if, for example, it cost the railroad twice as much to haul salt as to haul an equal quantity of iron ore the same distance, the charges for the former shipment would, upon the basis of the principle of cost of service, be twice as great as for the latter shipment. The advocates of this theory believe that in proportioning the freight charges to the actual cost there will be no possibility of shifting the losses on one transaction upon the shoulders of other shippers, and in consequence that there would be perfect equality and fairness as between different shippers, localities and commodities.

This theory, however, shatters completely upon the impossibility of determining cost. In railroad operation there are numerous joint or common costs which are not affected by an increase or a decrease in the traffic, and which, therefore, cannot be relegated to one or another of the various services which the railroad performs. If, on the other hand, instead of trying to base the rates and fares upon the average cost, the attempt is made to base them simply upon the marginal cost, or upon the actual increase caused by the performance of the particular service, the difficulties will increase rather than diminish. The actual increased cost of hauling a thousand pounds of nails will depend upon whether it is necessary to add a new car or even start a new train, or whether it is possible simply to fill more completely a car already used; and in this latter case the additional cost would be almost inappreciable. The marginal cost fluctuates immensely, though, as a rule, it amounts to almost nothing, and it would be utterly impossible to defray the cost of operation, to say nothing of paying interest on the indebtedness of the road by charging only the marginal or additional costs involved. To charge any fixed proportion of such marginal cost, moreover, as three, or five, or ten times that sum, would produce the very inequalities which it is desired to avoid. Moreover, even if it were possible to determine the cost of operation in theory, rate-making based thereon would inevitably involve the railroad in a great deal of socially unprofitable transportation, while much of the carriage of articles now considered necessary would be impossible if such a policy were put into force.

The second theory of transportation, namely, that of basing the charges upon the value of the service to the shipper or the traveler, is the principle which, within broad lines and under certain definite limitations, has usually been adopted. This theory is called charging what the traffic will bear, a theory which, in its unlimited application, has led to great abuses, and which, consequently, has been generally condemned. Carried out to its logical conclusion, the theory of charging what the traffic will bear, or charging to the prospective passenger or shipper the whole, or almost the whole, of the value which he is to derive from the service would justify the most revolutionary confiscation of property, and the gravest discrimination as between persons or places. It would, theoretically, be possible, under this principle, to charge the farmer such a sum as would render it almost a matter of indifference whether he shipped his grain or burnt it, or whether he continued cultivating or not; and the same may be said of other industries, especially those which are immovable. In the same way it would be theoretically possible to exact from certain passengers a sum immensely larger than the ordinary fare, on the ground that the necessity of their travel was so great, and the value of the service rendered so large, as to justify an exceedingly high fare. It would also be possible to charge such rates to cities not favored by competition of water-ways, as to enable the entire social surplus to be diverted to the railroad company.

In actual practice, however, the theory of what the traffic will bear has not been applied, and, in fact, could not be applied, in the literal manner here outlined. From the first, it was found impossible to bargain separately with each individual shipper and, above all, with each individual passenger, and certain tariffs, or schedules of rates and fares, were adopted, which have been more or less rigidly adhered to. The common law, the charters of railway corporations, as well as supplementary statute regulations, have limited the power of railway companies to carry this principle of charging what the tariff will bear to its final logical conclusion; and although railway history is replete with instances of charges which have not only been equal, but even superior to what the traffic would bear (resulting, in consequence, in a complete destruction of the traffic), such charges have usually been in contravention of the rights of the public.

While the only fundamental principle, therefore, which can be adopted, is that based on the value of the service or what the traffic will bear, both the common and the statute law have considerably abridged the application of this principle, and have demonstrated its inefficiency. The limitations put upon this principle, however, have differed in various parts of the world and under varying governmental policies. The theory, according to which it is attempted to limit the universal application of the theory of what the traffic will bear, may be called the theory of the socialization of rates. In other words, it is the aim of the government, whether by ownership of the railroads or by regulations of their rates, to pursue certain definite social aims. The aims that have been pursued will differ in different countries, and may be considered good or bad, as the case may be, but in all countries such limitation has been resorted to. The prohibition of personal and place discrimination is the result of the pursuit of a social aim, namely, that of endeavoring to secure stability of relations and equality of conditions as between producers. The reduction of fares on French railways at a sacrifice to the national treasury, and perhaps to the railroads themselves, was done in pursuit of a social aim, namely, that of increasing travel, and the same result has been attained in all countries by limiting, by means of maximum legal fares, the application of the principle of what the traffic will bear. The railways of the country may also be used to create a tariff barrier against other countries; to effect a redistribution of industry; to ameliorate the condition of a certain class or a certain industry; to afford a premium upon the exportation of a certain article; to break down the tariff wall of a neighboring country; to aid or injure the peasant class in its competition with large landholders; to afford the greatest facility for the movement of large bodies of troops, etc. The railroads may further be used in aiding or hindering the most important industrial, political or social movements. Rates may be so fixed as to aid in the centralization of industry, or to prevent such centralization; they may aid or hinder in extending the sphere of industrial activity; they may benefit agriculture at the expense of industry, industry at the expense of agriculture, or mining at the expense of both; they may effect a redistribution of population in certain districts of a country, or within a city itself; they may divert travel and traffic from one part of the country to another, and cause a rise or a decline in the value of urban property; they may foster the growth of a certain political party, and may effect social changes as radical and as revolutionary. In general, however, the government aims at increasing the resources of the country and the stability of its own organization, and to comply with certain not always definite social demands for equality and justice.

The extent to which the socialization of rates may proceed will depend upon the extent to which they are under control of the representatives of the nation. Where the state owns and operates its own railroads, there is no limit to the extent to which such social aims, whether good or bad, may be pursued. It has even been advocated that railroad transportation from one part of the country to another should be perfectly free, and that in the transportation of persons, as well in that of property, the use of the railroad should be as free as that of the highway, the necessary costs involved being defrayed by the general taxpayers. This is merely an example of the extent to which it would be feasible to revolutionize conditions and to effect the universally adopted social aims.

It is not my present purpose, however, to enter into a discussion of the rules which should be adopted in the freight traffic, but merely to hint at their necessity both for freight and passenger traffic. Such rules will vary in different countries with variations in industrial conditions. Where the railways are independent of the public it cannot straightway be assumed that their interests are identical; nor is the problem without difficulties even where the railways are owned by the state. All industrial communities consist of a number of separate, struggling, mutually antagonistic groups, and the condition of each of these groups will be either improved or impaired by every variation in the transportation charges.

It should, therefore, be no matter of surprise that even in countries, such as Prussia, where the railways are owned by the state and controlled avowedly in the interest of the community, the freight rates should be the subject of constant contention and the cause of much dissatisfaction. In the freight traffic there are too many conflicting interests to permit an easy reconciliation. The competition of shippers, or of classes of shippers, as well as that of separate districts occasion constant readaptations and changes in the tariffs, and the competition of canals and other water-ways introduce new elements. The interests of rival exporting cities, and those of the railway itself, influence the calculation, and make any adjustment so complicated a series of compromises that a schedule of rates that will be satisfactory to all parties becomes almost an impossibility.

The satisfactory determination of passenger fares, however, presents less difficulty, since the interests involved are fewer and less vital. In both forms of traffic (freight and passenger) there is represented the interest of the consumer. In the freight movement, however, this interest is subordinate to the interest of the producer, which is predominant, while in the passenger traffic the interest of the consumer is the principal one. It is true that to a certain limited extent the interest of the producer is involved in the passenger traffic, since the expenses of traveling agents, or salesmen, is a part of the legitimate expense of a large business. The case of suburban fares also affects the problem of urban rates, and it is possible for a railroad, either by high fares or poor passenger service, to injure a city, or, as in the case of Budapest, to facilitate its growth by specially organizing passenger fares.

Speaking broadly, however, the only person interested in the passenger service is the consumer or the traveler.

This difference is reflected in the varying character of the demands made for passenger and for freight transportation. A reduction in freight rates may be of benefit to the producer of the articles transported, but it is a dearly bought advantage if secured at the cost of an adverse discrimination, namely, of a still lower rate in favor of rivals. In freight transportation it is to the interest of every shipper not so much to secure low rates, but to secure rates as low, or lower, than those of rival shippers. It is relative and not absolute cheapness that the shipper in common with all competing producers really desires. The passenger, on the other hand, desires absolute rather than relative cheapness, and in the great majority of cases cheap passenger fares would be desired even on the condition of still cheaper fares being given to other classes of passengers. There is no place in the natural course of the development of passenger fares for any serious personal or place discrimination, for competition between foreign and domestic producers, or between neighboring export cities. The only interests materially involved are those of the railway and of the traveling public, and the question of passenger policy, therefore, resolves itself largely into one of the amount of the fare and the quality of the service.

The most effective manner of consulting the interests of the public without unduly sacrificing those of the railroad is to attempt to stimulate the traffic most readily answering to stimulation and to apply the incentive to which the particular form of traffic most readily responds. The general principles of such a policy it has been attempted to outline in this chapter.

CHAPTER VI.

THE PASSENGER TARIFF POLICY OF EUROPEAN RAILWAYS.

Before discussing the tariff policy of the various European countries, it will be necessary briefly to discuss railway conditions there prevailing. In point of mileage Germany[1] leads all European countries, having a total mileage in 1898 of 49,560 kilometres (as compared with 300,000 kilometres for the United States). Russia (including Finland) is second in point of mileage, its railway net being (in 1898) 42,535 kilometres in length; then come France, 41,703 kilometres; Austria-Hungary, 35,113; Great Britain and Ireland, 34,668; Italy, 15,715; Spain, 13,048; Sweden, 10,240; Belgium, 6,089; Switzerland, 3,708; Holland, 3,164; Roumania, 3,051; Denmark, 2,605; Turkey (including Bulgaria, Roumelia, etc.), 2,569; Portugal, 2,362; Norway, 1,981; Greece, 952, and Servia, 570, while Malta, Jersey and Man have 110 kilometers.

Until 1870 the passenger mileage of Great Britain and Ireland was the greatest in Europe, but during the seventies she was overtaken by Germany, during the eighties by France, in 1893 by Russia, and in 1898 by Austria-Hungary. In the railway mileage per square mile of area, the United Kingdom still leads all these countries and is second only to Belgium. The passenger mileage of the principal European countries per 100 square miles of area in 1898 was as follows: Belgium, 31.2; Great Britain and Ireland, 17.6; Switzerland, 14.3; Holland, 14.2; Germany, 13.7 (Saxony, however, 31.9); France, 12.7;

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[1] In comparison with these statistics, British India in 1898 had 35,384 kilometers of railway, British America 27,161, and Australia 23,334 miles. The above statistics are taken from the *Archiv sum Eisenbahnwesen*, 1900, page 763 *et. folg.*

Denmark, 11.0; Italy, 8.9; Austria-Hungary, 8.4; United States, 6.1; Portugal, 4.0; Spain, 4.0; Sweden, 3.7; Roumania, 3.1, and Russia, 1.3. In this table it is clearly seen that the countries with the densest populations, Belgium, Saxony, United Kingdom, Holland, Switzerland, etc., have the closest network of railways; if we take the statistics of railway mileage per unit of population, however, the result is somewhat different. Here the sparsely populated districts have frequently the greatest percentage. The railway length per 10,000 inhabitants was 26.5 miles in the United States in 1898 and 32 miles in British North America. For Europe the railway mileage per 10,000 of population was as follows: Sweden, 12.7; Switzerland, 7.6; Denmark, 6.9; France, 6.7; Norway, 5.7; Belgium, 5.6; Great Britain and Ireland, 5.3; Austria-Hungary, 4.8; Spain, 4.3; Holland, 3.8; Roumania, 3.1; Italy, 3.1; Portugal, 2.9, and Russia, 2.5.

Each of these series of figures gives one view of the railway development of the various countries, but each of them is incomplete. The length of the railways required does not depend upon the population alone, nor upon the area alone, though the mileage should increase with each of these factors. Perhaps the nearest approach to the solution of the somewhat indefinite problem as to the proper development of railways in proportion to the needs of the country is to be found by comparing the ratio both with the area and the population; in other words, by multiplying the number of miles of railway per given area (say, 100 square miles) by the number of miles of railway per given population (say, 10,000 inhabitants).

The resulting figure has been called by the Germans *Eisenbahnausstattungsziffer*, or the ratio of railway provision. If any such calculation can afford a general test of the adequacy with which a country is provided with railways, it could, in my judgment, be better obtained by taking the square root of the *Eisenbahnausstattungsziffer.*[1] The railway ratio thus obtained, though somewhat arbitrary, is the nearest approach to a mathematical statement of the comparative adequacy with which a country is provided with railways. The railway ratio of the principal countries is as follows: The United States, 12.4; Belgium, 13.7; Switzerland, 10.4; United Kingdom, 9.7; Germany, 9.4 (Saxony, 11.7); France, 9.3; Denmark, 8.8; Holland, 7.3; Sweden, 6.9; Austria-Hungary, 6.4; Italy, 5.2; Spain, 4.2; Portugal, 3.4; Roumania, 3.1; Norway, 2.4, and Russia, 1.8.

The railways of Europe present as many differences in general policy as in the extent to which they have been introduced and the rapidity with which they have been constructed in the various countries. The railway policy of European countries has been dictated largely by general economic and political conditions, as well as by military exigencies. At the time that the railways arose the policy of governmental interference in industrial enterprises was in disfavor and the general trend of opinion was for some time in favor of private railways, with a certain amount of governmental control. The English railways were owned and operated by private companies, and in Prussia, Bavaria, in Switzerland and Holland the first railways were owned by companies, whereas the French, after much consideration, also went over to this plan. Even in Austria and Russia the first railways were not state enterprises, although the Belgians had already demonstrated

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[1] If we do not take the square root the ratio of adequacy of railway development will increase with the square of the increase in construction. The following is the method used for obtaining what may be called the railway ratio of a given country. In the United States the mileage is 178.709 miles, the population (1890) 62,622,250, and the area 3,207,613 square miles. The railway ratio per 100 square miles and per 10,000 inhabitants is as follows:

$$\sqrt{\frac{\frac{176,709}{3,027,613}}{100} \times \frac{\frac{178,709}{62,622,250}}{10,000}} = \sqrt{\frac{31,937,000,000,000,000}{189,594,000,000,000}} = \sqrt{168.5} = 13.0$$

that the state was in a position to operate railroads. In May, 1834, a law was passed providing for the construction of state railways in Belgium, and this policy was soon followed by some of the smaller German states. The great tendency towards state railways was delayed, however, until the end of the seventies. In Germany the attempt to buy up all the railways by the empire was then made, and Prussia and other German states continued rapidly to absorb the private roads. In Austria and in Hungary the same policy was observable and in France the construction of the state network of lines was projected and a proposal made to buy up all the private roads for the state. At present the trend is still toward the ascendency of the state policy, except in those countries where a rapid absorption of the smaller by the larger lines has done away with many of the worst features of railway competition. Thus in England, Parliament has controlled the lines by the establishment of maximum rates, and by the laws of 1854, 1873 and 1888 has reinforced the provisions of the common law, but no attempt has been made to build state railroads, although Great Britain has adopted this policy in Natal, Cape Colony and India. In France the railways were constructed on a general scheme (1842) and regulated by a system of subventions and guarantees according to the Francqueville Law of 1859, but although from 1878 to 1883 a determined attempt was made by the state, headed by such men as Freycinet and Gambetta, to supersede the companies, this policy failed utterly, and the great bulk of the French railways is still in the hands of six great companies. These companies are subventioned in consideration of the recognition of certain rights of government regulation and the future surrender of the property to the state during the coming century. In Italy, after a confused lack of system, due to disorganized political conditions, the Italian government bought up the railways, and, after mismanaging them, leased them out to private companies with unsatisfactory results. In Holland the same policy was tried with little more success, though attempts have been repeatedly made to alleviate the conditions. In Germany the railways are in the hands of several states and also in those of private companies, but the railways of Alsace and Lorraine are owned by the Empire. The Empire possesses considerable power of regulation (even over rates), particularly in times of war, and may even construct and operate railways in the several states, with or without their concurrence. In Belgium the railways are also principally state roads, though since 1844 private railroads have also been built. The Scandinavian countries incline towards state roads, especially in the case of Denmark and Norway, but in Sweden state and private roads compete for the same traffic. In Russia the system has been subject to constant change, but is largely one of private roads, built by foreign capital and subventioned by the state; whereas in Austria-Hungary, after considerable wavering, the policy is now distinctly toward state railways.[1]

Despite the difference in the attitude assumed by the state toward railway construction and management, and despite also the differences in the cost of construction,[2] there has been a certain similarity in European and above all in Continental countries, in their treatment of the problems of passenger tariffs.

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[1] In Italy (91), 5,246 miles state railways, 2,794 companies, 96 state and companies; in the United Kingdom (95), 21,174 companies in Austria 4,950 S. (state) 4,561 C. (companies) S. and C. (state and companies); Hungary (95), 6,725 S., 1,492 C.; Denmark, 1,067 S., 340 C.; France (96), 21,007 C., 1,700 S.; Netherlands (96), 886 S., 788 C.; Portugal (96), S. 537 C.; Spain (94), 7,543 C.; Sweden (95), 2,030 S., 4,028 C.; Norway (95), 1,014 S., 59 C., etc.

[2] The cost of construction of European railways has been, on the whole, considerably greater than in America. The cost per mile in the United States has been $62,900 (1894); in the United Kingdom the cost (1894) has been $224,400; in France (1894) $130,603; Belgium (state railways, 1893) $129,633; in Italy (for the chief railways, 1890) $121,000; Switzerland (1893) $102,261; Germany (1895) $97,000; Austria-Hungary (1891) $92,800; Spain (1889) $86,175; Russia (1892) $84,300; Holland (1887) $81,000, etc. The average cost of construction of railways in Europe was thus almost twice as great as that in America. It should be observed, however, that these figures represent capitalization rather than actual cost, and allowance must therefore be made for fictitious investment over capitalization and stock watering.

In many respects the passenger fares have been arranged on principles similar to those applied in the determination of freight rates, though it has been found necessary to make allowance for differences in the nature of the two forms of traffic. Thus, in the passenger traffic the terminal expenses are far less than in the freight traffic, just as in the latter case they make up a smaller proportion of the total expense than they do in the postal service. In consequence the fares have, as a general rule, increased with the distance traveled, and a uniform charge has generally been made per mile traversed. As in the freight traffic, so in the passenger service, there is a division of the persons or things carried into classes, according to the conditions of traffic and their ability to pay the charges of transportation. In Europe a three-class system is generally in vogue, though in some countries there are four classes, and besides this division, which is one of comfort, there are generally special rates for higher rates of speed. These two classifications of speed and comfort formerly coincided approximately, since only the more comfortable and higher-priced carriages were moved at a high rate of speed; but speed is now becoming general even on third-class cars. In most countries there are normal rates prescribed per mile for each class of cars, and these are accompanied by a series of reductions for different forms of travel.

In Germany, as in other European countries, the fares have been based on the number of kilometres traveled, and a series of exceptional fares were based upon these normal rates. In the north of Germany, on the Prussian state railways, and on the Saxon state railways, the normal fares are 2.08 cents per mile first class, 1.56 cents second class, 1.04 cents third class and 0.52 cent fourth class, on slow trains. Fifty pounds of baggage are allowed free in the first three classes, and an extra charge of 0.16 cent is made on every 20 pounds carried one mile. The charge for express trains varies from 10 to 15 per cent higher, being 2.14 cents first, 1.73 cents second and 1.21 third class, the fourth class not being carried on express trains. The return tickets good for three days on distances of less than 200 kilometres (124.4 miles), for four days on distances of 300 kilometres and so on, are sold at one and one-half times the normal rate of a single trip, being 3.12 cents first, 2.34 cents second and 1.56 cents third. There is no reduction on fourth-class return tickets, while in the other classes no extra charge is made on return tickets for express trains.[1]

In South Germany the fares for second- and third-class traffic are cheaper, but there is no fourth class. On the state railways of Baden, Bavaria, Württemberg and Alsace and Lorraine the fares are 2.08 cents first, 1.38 cents second and 0.88 cent third class. The increase for express trains is greater than in North Germany, amounting in the third class to over thirty per cent, the express fares being 2.37 cents first, 1.66 cents second and 1.17 cents third class. There is a reduction on return tickets, but on these return tickets an extra charge is made for express trains.[2] On these roads a general allowance of twenty pounds of free baggage is made, and for each twenty pounds above this a minimum charge of 0.09 cent per mile is made. The Mecklenburg railways charge express rates for both express and accommodation trains, but otherwise model their fares according to the North German system. The private railways generally arrange them according to the district to which they happen to belong.

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[1] These two conditions work against the development of fourth-class traffic. If one wishes to travel 100 kilometres on the Prussian state railways it will cost: fourth class 2.00 marks, third-class express 4.67 marks, an increase of 133 per cent. If a return trip, however, is to be taken, the charge will be 4.00 marks fourth class and but 6.00 marks third-class express, an increase of but 50 per cent. There is also no free baggage in the fourth class.

[2] The higher classes are treated more favorably than the lower. Thus, on the state railways of Baden the additional charge for an express train is 32 per cent in third, 21 per cent in the second and only 14 per cent in the first class.

The Hungarian state railways have adopted a diametrically opposite system of normal passenger fares. The third class is considerably favored, the first-class fare being for the first twelve zones 240 per cent and the second class 150 per cent of the third-class fare (as compared with 200 and 150 per cent in North Germany and 235 per cent and 156 per cent in South Germany). The increase fare for the express service is 25 per cent in the first and second and but 20 per cent in the third. Owing to the cheap local fares there is an exceedingly slight increase in the fare per kilometre until the last zone, when the kilometre fare diminishes very rapidly.[1] Thus the lowest kilometre fare for the first zone (25 kilometres) third-class accommodation train would be one kreuzer (0.643

	Express Trains. Cents.			Accommodation Trains. Cents.		
	I.	II.	III.	I.	II.	III.
Local Traffic:						
Zone 1 (0–6.2 miles)	...	...	...	19.3	9.7	6.4
" 2 (6.2–12.4)	...	...	...	25.7	14.2	9.7
" 3 (12.4–18.6)	...	...	...	32.2	19.3	12.9
Through Traffic:						
Zone I. (0–15.6 miles)	48.3	32.2	19.3	38.6	25.7	16.1
" II. (15.6–24.9)	96.6	64.4	38.6	77 3	51.5	32.2
" III. (24.9–34.2)	144.9	96.6	58.0	116.0	77.2	48.3
" IV. (34.2–43.5)	193.2	128.6	77.3	154.6	103.0	64.4
" V. (43.5–52.8)	241.5	161.0	96.6	193.2	128.8	80.5
" VI. (52.8–62.2)	289.8	193.2	116.0	232.5	154.5	96.6
" VII. (56.2–71.5)	338.1	225.4	135.3	270.6	180.3	112.7
" VIII. (71.5–80.8)	386.4	257.6	154.6	309.2	206.0	128.8
" IX. (80.8–90.1)	434.	289.8	174.0	348.0	231.8	144.9
" X. (90.1–99.4)	483.0	322.0	193.2	386.4	257.6	161.0
" XI. (99.4–108.7)	531.3	354.2	212.5	425.0	283.3	177.1
" XII. (108.7–124.4)	579.6	386.4	231.9	464.0	309.1	193.2
" XIII. (124.4–140)	676.2	450.8	274.4	521.6	347.7	225.4
" XIV. (over 140)	772.8	515.2	309.1	579.6	386.4	257.6

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[1] Paers (including government duty).

cent per mile), for the second zone it would be 1.125 kreuzers, for the sixth zone 1.50 kreuzers, for the eleventh zone it would be 1.56 kreuzers. For a distance of 250 kilometres it would be 1.60 kreuzers; for 400 kilometres, 1.00 kreuzer; for 800 kilometres, 0.25 kreuzer, and so forth.

On the Hungarian state railways there is no free baggage and there are no return tickets issued. In Austria the fares increase with every 10 kilometres; there are three classes, —additional fares for express trains, no free baggage, and the charges for the baggage are also arranged according to a zone system. The Belgian railways have three classes, the fares for which are at the ratio of 2, 1½ and 1. The ordinary rate per mile is, first, 2.26; second, 1.77, and third, 1.18, and on return tickets, first, 3.75; second, 2.82, and third, 2.02 cents per mile. An extra charge of 25 per cent is made for the express trains, the fares being, first, 2.93; second, 2.20; third, 1.47 cents per mile, and on return tickets, first, 4.70; second, 3.52, and third, 2.17 cents per mile. Baggage up to 50 pounds is free. A ticket, good on all Belgian roads for fifteen days, is sold at 50 francs for the first, 38 for the second and 25 francs for the third class. The railways of the other countries have adopted somewhat similar methods of arranging normal rates. The charges on Italian roads are approximately 3.52 cents per mile for the first, 2.48 for the second and 1.61 cents for the third class. The Swiss railways charge the rates of 3.26 cents per mile first, 2.26 cents second and 1.64 cents third class. The rates on the Dutch railways are cheaper, being 3.20 first, 2.56 second and 1.60 cents third class, for the first 50 kilometres (31.1 miles), and falling to 2.56 first, 1.92 second and 1.28 cents third class per mile on distances beyond the first 50 kilometres.

In Spain the rates are higher, ranging per mile between 3.4 and 3.7 cents first, 2.5 and 2.8 cents second and 1.55 and 2.02 cents third class, but the English normal surpass even these high rates. Since the reduction of the French fares (caused by the remission of the additional government duty and corresponding concessions on the part of the railways) the normal fares have corresponded quite favorably with those of the rest of Europe, being 3.78 cents for first, 2.35 for second and 1.53 cents for third class, while at the same time each passenger is allowed sixty pounds of baggage free.

These fares are really higher than those actually paid by the average traveler, owing to the fact that there are many reductions from these rates.

Thus the Prussian railways make a reduction of 50 per cent on single tickets of societies who are thirty or more in number, and a reduction of 33⅓ per cent on return tickets (a single ticket 4*d.* per kilometre, considered equivalent to return ticket 6*d.* per two kilometres). The same reductions are made for members of German schools or universities traveling with their instructors for scientific purposes in companies of ten or more. A reduction of 50 per cent is also made in the case of indigent invalids going to the baths, for scrofulous children, orphans, deaf and dumb children, or for indigent inmates of blind asylums (a military ticket, 2*d.* being accepted for a third-class ticket, 4*d.* per kilometre). The same reduction from 4*d.* to2*d.* per kilometre is made for members of nursing societies traveling third class, or they may travel second class with third-class ticket (4*d* . instead of 6*d.* per kilometre).

In the other German railways reductions are made on a somewhat similar scale. Besides the above-mentioned reductions, the Bavarian railways make reductions for theatrical or musical societies, and for military musical bands; the Saxon railways allow three school-children under fourteen years of age or two over that age to travel on a single (adult) ticket. The Württemberg railways grant reductions for societies of thirty or more travelers provided the distance traveled be 30 kilometres or more, while the railways of Baden grant to impoverished German subjects in France or Switzerland, or to like subjects of Switzerland or Austria-Hungary who may be in Germany, a 50 per cent reduction on their trip home. These reductions are only granted on proof of the worthiness of the recipient.

The state railways of Austria grant 50 per cent reductions to groups of ten or more laborers (male or female) on distances of 300 kilometres or over, and a similar reduction to societies of travelers over a distance of 50 kilometres. To secure this reduction, there must be 100 persons in the first class, 150 in the second or 300 in the third. The state railways also grant reductions to state officials. The private railways in Austria grant generally a 50 per cent to their own officials and employes, and a similar reduction to teachers (male or female) in public schools, to indigent scholars, and to arrested criminals.

The Hungarian railways owned by the state grant a 50 per cent reduction to agricultural laborers in groups of ten and to other laborers in groups of thirty on all except express trains. Officials of the state are also granted reductions.

The Swiss railways grant reductions to schools and to traveling societies, to nurses, to indigent natives, and to impoverished Swiss returning from foreign countries.

The French railways grant 50 per cent reductions to singing, musical, gymnastic societies, to theatrical companies, to circuses, to colonists going to Algeria and to several other classes. The great companies grant a large number of reductions for scientific and charitable purposes. The Belgian railways make similar provisions for like purposes, and the national railways grant 50 per cent reduction to voters from the place they live to the place where the polls are held, and a like reduction is made in favor of Belgian emigrants provided they travel 30 kilometres on Belgian railways. The Italian railways grant reductions from 40 to 50 per cent to various government officials, to prisoners with escort and to those needing charity, as well as to voters and scholars in the advanced schools.

The Dutch railways grant reductions of 50 per cent to the blind, to orphans and to emigrants, to scholars or students in groups of ten or more, to laborers in groups of twenty or more. Emigrants in groups of at least forty can travel third class for thirty per cent of the usual fare. The English railways grant reductions to numerous bodies, including schoolboys, musical bands, firemen, poor children, certain government officials, teachers, medical students, etc.[1]

In consequence of these and other reductions the income per passenger mile is considerably less than the normal fare. On the Prussian state railways this amounts to 3.0 cents for the first, 1.9 cents for the second and 1.1 cents for the third class. In Württemberg the rates are 3.3 cents first, 2.0 cents second and but 1.1 cents third class, while in Alsace and Lorraine the rates were but 3.0 cents first, 1.9 cents second and less than 1 cent third class. The income per passenger mileage of the military was slightly less than 0.6 cent in all these countries. In Austria-Hungary the income per passenger mile was 2.3 cents first, 1.5 cents second and less than 0.9 cent third; in Holland this income was 2.5 cents first, 1.8 cents second and 1.0 cent third, while in Belgium the income per passenger was only 1.9 cents first, 1.4 cents second and less than 0.8 cent third class. Since the third class preponderates the income per passenger mile of all travelers approaches that of the third class. This income per passenger mile for all classes is: Prussia 1.1 cents, Bavaria 1.3 cents, Württemberg 1.2 cents, Baden 1.3 cents, Alsace and Lorraine 1.2 cents, Austria-Hungary 1.0 cent, France 1.2 cents, Holland 1.4 cents, Norway 1.3 cents, Sweden 1.5 cents per mile.

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[1] These data regarding reductions in fares are taken principally from the article on *Fahrpreisermässigungen* in Röll's *Encyklopadie des Gosammten Eisenbahnwesensp*, 1531 *et folg.*

CHAPTER VII.

PRESENT RAILWAY PASSENGER STATISTICS.

Railway passenger receipts may be considered as a quantity of three dimensions: the number of travelers, the average length of the trip, and the fare per mile. The first factor signifies the number of times that the population avails itself of the services of the railways; the combination of the first two factors, the total work done by the railway; and the combination of the three factors, the total remuneration for this work. Thus, if a railway carries 5,000,000 passengers, on an average of twenty miles at a mean rate of two cents per mile, its work will be equivalent to 5,000,000 times twenty miles, or 100,000,000 passenger miles; and its remuneration to 100,000,000 times two cents, or $2,000,000.

The statistics of passenger traffic may thus be considered from any one of these three points of view. They may, moreover, be considered as absolute figures or in relation to some other factor. Thus, the number of passengers on the railways of a country, or the number of passenger miles traveled, may be considered in relation to the population of the country to obtain statistics of per capita travel. The passenger mileage may be compared with the railway mileage in order to discover the passenger density or the average number of passengers carried over each mile of road. The passenger mileage may further be compared with the amount or mileage of the rolling stock. The passenger receipts may be compared with the total number of miles to discover the passenger receipts per mile of line; they may further be compared with the total receipts of the railroad, or with the receipts from freight traffic, or with the total capital of the railroad considered. Each of these comparisons is of value in showing certain features of railway management, but it would unduly lengthen the present chapter to make all these comparisons for all the countries of the world.

At the outset, moreover, it is desirable to draw attention to the inherent limitations of these statistics. Whatever comparison is made, there is always some disturbing element or factor, some essential difference between things compared which lessens the value, if it does not entirely vitiate the conclusion. The difference in the amount of comfort, the speed, and, in fact, of all the conditions of travel from the worst to the best, is so great as to render the unit of the passenger mile somewhat misleading. Neither the cost nor the value of a million passenger miles on a rural accommodation train in Prussia or Galicia can be compared with the same traffic on through express trains from New York to Washington or from Paris to Brussels, and the same difficulty is encountered in comparing the passenger traffic of various parts of the same country, or the passenger traffic of the same road at widely separated periods. By the passenger mileage is meant nothing more nor less than the haulage of persons a certain distance. It signifies merely traveling, and is irrespective of all the conditions of travel.

These statistics, however, do not even attain this degree of accuracy, since they do not always include the whole travel by rail. Differences in the legal status of railroads in different countries have, among other causes, led to differences in the method of keeping statistics, and the greatest variations in obtaining the figures of the passenger traffic. As a general rule, the statistics of passenger traffic are obtained from calculations made upon the basis of the tickets issued; but there are considerable variations in the method and the accuracy with which this is done. This leads to a considerable discrepancy even in the statistics of ordinary travel. In statistics of season-ticket travel, however, these differences are still greater. The British statistics entirely disregard this travel in their calculations, and in different countries of Europe different arbitrary rules are assumed for arriving at the average amount of travel which is supposed to be done in this way. The different methods of counting the travel of children, the transportation of persons on passes, the carriage of the military, or of officials of the road or of the state, the varying factor of fictitious travel of persons who buy tickets but do not use them; these and various other factors tend to render the statistics of passenger traffic somewhat inexact.

A more inconsiderable element of variation, however, resides in the difficulty of defining what railroad passenger traffic is. The question of the admission or exclusion of urban railways is one which affects the total,[1] and where the urban or interurban street railway uses steam as a motive power the difficulty becomes greater. The extension of electric street railways into interurban railroads, and the carriage of passengers by such interurban railways, further complicates the situation, especially as the distinction between the extended street railway and the old steam or commercial railroad, at least in relation to their passenger traffic, is rapidly breaking down.

Passenger mileage, however,—in other words, the number of passengers multiplied by the number of miles which they travel,—is the best unit of comparison, since, with all its defects, it most clearly represents the work done by the railroad. An attempt will be made in the present chapter to draw attention, in each case, to any great disturbing factors which would vitiate the conclusions, although no attempt will be made to point out differences in the character of the service between the railroads of the countries compared. Under such conditions the conclusion may be considered as approximately accurate, and the percentage of probable error may be considered small.

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[1] There were carried in Massachusetts, in 1897, 103,000,000 passengers by the steam railways and 309,000,000 by the street railways. The average distance carried by the street railways was probably only about two miles, but the difference between this distance and that carried by Belgian steam railroads is not greater than the distances made on an average on Belgian and on American steam railroads. In American statistics the 309,000,000 are disregarded.

The statistics of the number of passengers are, perhaps, more misleading than those of the passenger traffic, owing to the inherent difference between short and long trips, and the effect of inclusion or exclusion of traffic which is urban or suburban. The statistics of passenger receipts are less liable to such discrepancies, although the returns for various countries differ in including or excluding elements which may doubtfully be considered as passenger receipts. The difficulties which inhere in all statistics of passengers or passenger miles are naturally repeated in the statistics of passengers or of passenger mileage per capita, with the added difficulty that in various countries the traveling is done by a larger or smaller percentage of the whole population. The statistics of passenger mileage or passenger receipts, per mile of road, do not account for differences in the character of the roadbed, the density of the population served, the number of tracks, etc., and should, therefore, be considered in relation with the other comparisons made.

In view of these difficulties, therefore, I shall endeavor in the following chapter to make my comparisons in such a way that the conditions which must be neglected in one comparison shall be shown in another, so as to permit of the presentation of as complete a picture as possible of the railway passenger traffic of the countries compared. The detailed statistics being given in the subsequent chapters, however, the comparisons will here be made in a more general manner, so as to give an outline rather than exact statement of the volume of the traffic.

In 1898, according to Poor, the passenger mileage of American railroads was 13.7 billions of miles (13,672,497,664).

This mileage was not as great as that of 1893, when it amounted to 15 billions of miles. The contemporaneous traffic on European railroads was less, the United Kingdom having an estimated traffic (not including season-tickets) in 1894 of about 9 billions, or 60 per cent of the American traffic. Germany (1894–95) 7.970 millions, or 53 per cent; France (1894) 6.530 millions, or 43 per cent; India (1894) 6.007 millions, or 40 per cent; Russia (1893) 3.587 millions, or 24 per cent; Austria-Hungary (1891) 2.769 millions, or 18 per cent; Australia (1894 est.) about 1.4 billions, or 9 per cent; while Italy (1894) had 9 per cent, Belgium 8 per cent, Switzerland and Holland each 3 per cent; Sweden, Roumania and Denmark between 1 and 2 per cent, while Algiers and Tunis and Norway had less than 1 per cent of the passenger mileage of American railways.

The American traffic is accommodated, however, on an immense network of railroads, and the density of the traffic (number of passenger miles per mile of railway) in the United States is much less than in most European countries. While in 1895 there were 69,000 passengers per mile of railroad, there were 163,000 in Russia, 228,000 in Switzerland, 238,000 in France, 265,000 in Germay, approximately 450,000 in Great Britain (not including season-ticket travel) and 500,000 on the state railroads of Belgium. In other words, there were seven passengers carried over every mile of the Belgian state railways for every passenger carried over the whole network of American railways. The average for American railways is brought down by the low density in some of the Southern and Western regions, where the density ranged between twenty-five and forty thousand. In the middle states the density was 178,000, or greater than that of Russia, and in New England 240 000 or about the same as that prevailing in France.

In proportion to our population our passenger mileage is second to that of Great Britain, the average Briton traveling (in the period under consideration) about 245 miles, the average American about 220, the German 175 and the Frenchman about 165 miles.

In the number of passengers, the United Kingdom easily leads the list of nations. In 1897, the number of passengers on the railways of the United Kingdom (not including the large season-ticket travel) was 1030 millions; next in rank comes Germany (1896–7) with 646 millions, or 63 per cent of that of the United Kingdom; the United States (1899) with 523 millions, or 51 per cent; France (1896) with 363 millions, or 35 per cent; Austria-Hungary had 162 millions, or 16 per cent; (Austria (1896) 105 millions, Hungary (1897) 57 millions); India (1897) 151 millions, or 15 per cent; Belgium (1896) 107 millions, or 10 per cent; Japan (1896–7) 65 millions, or 6 per cent; Italy (1892) 50 millions, or 5 per cent; Russia (1895) 49 millions, or 5 per cent; Switzerland (1897) 46 millions, or 4 per cent; Mexico (1896) 26, Netherlands (1897) 25, and Sweden (1896) 20 millions, or from 2 to 2½ per cent; Canada (1897) and Argentina (1897) each with 16 millions, or 1½ per cent; Egypt (1897) 11 millions, or 1 per cent; and Portugal (1897) with 10, and Norway (1896–7) with 8 millions of passengers.

In proportion to population, also, the British take by far the largest number of trips on steam railroads. The per capita traveling of the United Kingdom is 27, that of Belgium is 17, of Switzerland 15, of Germany 12, of France 10 and of the United States (population of 1900) about 6.9. The per capita traveling of other nations is much less, that of the Netherlands being 5, Austria-Hungary 4, Argentina 4, Sweden 4, Norway 4, Canada 3, Mexico and Portugal 2, Japan and Italy 1½ and India and Russia ½.

CHAPTER VIII.

DEVELOPMENT OF PASSENGER TRAFFIC IN GREAT BRITAIN.

Even before the introduction of the railway, the English were known as a race of travelers. The indentation of the British coast and the large number of navigable rivers had given the English splendid means of water communication and these had been supplemented by an admirable system of turnpike roads which made traveling by coach comparatively comfortable and rapid in Great Britain. In his "Progress of the Nation"[1] Porter estimated that the whole body of Englishmen traveled by stage-coach in 1834 a distance equivalent to the conveyance during the year of one person 358,295,652 miles, and as he estimates that but 2,000,000 people used the coaches at all, each passenger would travel 160 miles per year on the average. While these figures appear to be exaggerated, and while they make up hardly one-twenty-fifth of the traveling of Englishmen to-day, they represented for those times so intense a traffic as to justify a French Minister of Commerce in alluding to the *viabilité immense* of the English.[2]

Until the opening of the Liverpool and Manchester line in 1830 all railways were primarily constructed with the object of obtaining freight traffic, and even the Liverpool and Manchester line estimated its probable receipts from the conveyance of passengers at only about one-twentieth of what it almost immediately became. Perhaps the directors had still in mind the prophecy of that "Quarterly" reviewer, who said that

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[1] "The Progress of the Nation in Its Various Social and Economic Relations, from the Beginning of the Nineteenth Century." By G. R. Porter, Esq., F. R. S. London, 1851. Pages 299 and 300.

[2] Porter, page 288.

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"we should as soon expect the people of Woolwich to suffer themselves to be fired off upon one of Congreve's *ricochet* rockets as to trust themselves to the mercies of such a machine going at such a rate" (18 or 20 miles an hour). In their prospectus the directors modestly intimated that perhaps one-half of the people then traveling by stage-coach would use the railway on account of its superior cheapness. The extended use of the traveling facilities, however, was immediate. In 1831, the first full year of operation, there were already 445,057 passengers; by 1836, 597,559, and by 1844, 652,346 passengers, and by the latter year the London & Birmingham Railway was carrying 851,968 passengers an average distance of 65.5 miles. The large number of persons who used the railway as early as 1830, however, was another proof of the great extent to which traveling was common in Great Britain during the stage-coach period.

But the passenger traffic of the railways was destined soon to assume proportions compared to which the traffic in the pre-railway period appeared feeble indeed. According to the Report of the Commissioners of Railways for 1850 the number of passengers on British and Irish railways increased from 33.8 millions in 1845 to 43.8 in 1846, 51.4 in 1847, 58.0 in 1848, and 60.4 millions in 1849. Railway traveling thus increased almost 80 per cent in these four years and the British public, which made but 1.2 trips per capita in 1845, already made 2.1 trips in 1849.[1] By 1854 the number of passengers on railways in the United Kingdom, not including holders of of season tickets, had increased to 111.2 millions, by 1856 to 129.4 millions, by 1861 to 173.7 millions, by 1866 to 274.3 millions; 1871, 375.2 millions; 1876, 538.3 millions; 1881, 626.0 millions; 1886, 725.6 millions; 1891, 845.5 millions; in 1896 to 980.3 millions, and by 1897 to 1,030.4 millions. The number of railway trips (exclusive of those taken by holders of season tickets) increased from 1.2 in 1845, 2.1 in 1849, 4.0 in 1854, 4.7 in 1856, 5.9 in 1861, 9.4 in 1866, 11.8 in 1871, 16.9 in 1876, 17.7 in 1881, 20.6 in 1886, 22.2 in 1891 and 25.7 in 1896. As will be seen later the English at present take more trips than do the French and Germans combined, and had already attained a far greater per capita traveling in 1866 than either the French or Germans possess to-day. It is this fact which makes the development of the passenger traffic of English railwavs particularly interesting.

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[1] Population of each year considered equal to that of the last census year.

We have seen that in no country in the world has there been so great a development of the passenger traffic of railways as in the United Kingdom. While the actual mileage traveled by passengers is greater in the United States, the British Isles excel all countries in the density of their traffic, in the total number of journeys undertaken and in the average traveling per head of the population. It is probable that the distance traveled by passengers on British railways equals that which would be made by 400,000 passengers annually traveling over the whole length of British railways, while the passenger density is but 315,000 for Germany, 273,000 for France and not quite 72,000 for the United States.[1] The total number of trips on German railways is 592.3 millions (1896), on American railways 511.8 (1896) and on French railways 369.9 millions (1895); but the number of passengers upon British railways, without including any of the season-ticket travel, was 1,030.4 millions in the year 1897. The average Briton thus travels from two to three times as often as the German, Frenchman or American.[2]

The magnitude of the British passenger traffic is due to a number of causes, which will be discussed later, but one reason for this pre-eminence may here be stated. At the beginning of the railway era, England enjoyed a commercial and an industrial supremacy, which she has not yet entirely surrendered. It was in England that the railways took their rise and it was in that country that they developed at first with the greatest rapidity. By 1850, the mileage of British railways almost exceeded those of Germany, France, and Austria-Hungary combined, and even as late as 1870, the British Isles, despite their small area, possessed a net-work of railways considerably larger than that of any other European country. Since then, however, the railways of Great Britain and Ireland have been successively overtaken in point of mileage by those of Germany, France and Russia, though even to-day they rank first in the amount of capital and in their density of traffic. It is therefore not surprising to find that the early construction of railways in Great Britain was accompanied by an equally early and rapid development of the passenger traffic and that the present pre-eminence of British railways in this respect has been enjoyed by them from the beginning.

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[1] Passenger density is calculated by dividing the number of miles traveled by all passengers by the total railway mileage. For Great Britain the figures are roughly estimated, owing to lack of statistical data on the subject.

[2] This does not include street, but only steam railway traffic,

The most marked characteristic of the British passenger traffic, as compared with that of Continental countries, was its comparative freedom from minute governmental regulation. It is probable that the failure of the British Parliament adequately to provide for the regulation of rates and fares on railways was due, in part at least, to its misconception of the true nature of the railway. It was not the intention of parliament to give to railway companies a complete monopoly over their road, and provision was made to enable any one to use his own locomotive power upon the line of the railway company. But as early as 1839–40, it was recognized by the Select Committee on Railways, that the competition, foreseen by parliament, could not take place, and "that railway companies using locomotive power possess a practical monopoly for the conveyance of passengers on the several lines of railway." The danger of running rival trains over a single line, the lack of provision made for access to stations, watering places, etc., and the high tolls that the owner of the roadbed might legally charge the would-be independent carrier, made the right of the public to run their own cars perfectly illusory. It was also soon discovered that not only was competition on the same line impossible, but competition on different lines as well, and as early as 1844, Captain S. Laing, of the Railway Department of the Board of Trade, could cite a series of instances "in proof of the assertion that the public have never permanently benefited from competition between different lines of railway."[1] "Railway competition being, therefore, out of the question, and that of the old modes of conveyance equally so, from the immense superiority of the locomotive engine, railway companies may be taken, for all practical purposes, to possess a complete monopoly as far as regards the conveyance of passengers.[2]" In many of the Railway Acts a maximum toll for the use of the roadbed only had been established, while the company was permitted to fix the charge for carriage and locomotive power at its own discretion, or, if a maximum charge was fixed for the carriage, it was usually so high (3½*d.* per passenger per mile for a covered and 2½*d.* for an open carriage) as to be practically unavailing.

Since competition was not permanent or effective, and since the maxima charges were too high to keep down the fares, the regulation of the fares, as of the other conditions of travel, was left largely to the initiative of the railway companies. It is interesting to note that in England, as in other European countries, the system of fares was based directly upon that prevailing on the stage-coach. To quote once more from the appendix to the Report of the Select Committee of 1844, "The system generally adopted on the introduction of railways, was to provide a description of accommodation, and establish a scale of fares, analogous to those of the conveyances which were superseded. Thus each train had a first-class, corresponding to the inside of the old stage-coach; and a second class, in the absence of cushions, stuffings and other comforts, and in the exposure, or partial exposure, to the weather, corresponding to the outside. The fares also appear generally to have been regulated by some analogy to those formerly charged for inside and outside places by stage-coaches; that is to say, the rate of first- and second-class fares has been fixed just low enough to preclude the possibility of competition, and to give the railway the advantage of what may be called the latent coach traffic, developed by a slight advantage in economy, accompanied by an immense advantage in point of time and facility, but not so low as to call into play an entirely new description of traffic. The average rate of coaching fares, before the introduction of railways, was stated by Mr. Chaplain, the great coach proprietor, in his evidence before the Committee of the House of Commons on Railroads, in 1838, to have been about 4½*d.* per mile inside, and 2½*d.* per mile outside. This, we believe, upon most of the leading roads, where competition existed, to have been rather over the mark, especially for inside fares; but probably taking into account incidental expenses saved in traveling by railway, it may be nearly correct. The fares adopted by the leading railway companies have been about 3*d.* per mile for first-class, and 2*d.* per mile for second-class passengers. In addition to these two classes, several railway companies have adopted the system of providing an inferior and cheaper conveyance for the class of community who were previously restricted, by the high rate of fares, from traveling by coaches, and who either never traveled at all, or traveled on foot and by vans, stage-wagons and similar modes of conveyance. The rate of third-class fares was generally fixed at from 1*d.* to 1½*d.* per mile, and the accommodation provided of the poorest possible description, in carriages perfectly open, and often without seats, or confined to luggage trains, at much slower rates of speed, in order to maintain the distinction between the third and second class."[1]

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[1] Report of the Select Committee of 1844, page 19, Appendix.

[2] Page 20.

Thus, while the passenger accommodations on British railways were incalculably inferior in 1842, as compared with 1898, the fares at that time were considerably higher. The fares generally ranged from 1.44*d.* to 3.5*d.* for the first class, 0.96*d.* to 2.33*d.* for the second, and 0.64*d.* to 1.6*d.* for the third class. The minimum fares in each of these instances were to be found on the twenty-five-mile Ulster line, and the average rates for the whole Kingdom were nearer the maximum than the minimum rates for the various classes. The following table gives the average rate of fare paid by 20,012,881 passengers on forty-three of the principal railways during the calender year 1842:

Class.	Per Cent of Passengers.	Fare per Mile.
First	18.4	2.727*d.*
Second	46.0	1.745*d.*
Third	35.6	1.151*d.*
All classes	100.0	1.706*d.*

The high fares and dangerous and uncomfortable conditions of travel in the early forties, however, bore hardly upon the poorer classes, and traveling remained, as it had been before the advent of the railways, a luxury attainable only by the well-to-do. Upon the resulting and somewhat general discontent, the Committee of 1844 received a vast amount of evidence. It was of course admitted "that the mode of traveling by railways is not only cheaper in a pecuniary point of view, but in a vast saving of time,"[1] and the lessened danger from railway traveling was also admitted. "The number of accidents on the rail are (!) very much less, and the risk of accident is very much diminished; but the great weight and speed of the railway train renders (!) an accident, when it does happen, more severe or fatal in its consequences."[2] But traveling by rail, while an improvement upon the archaic modes of conveyance superseded, was for all but the affluent exceedingly dangerous and intolerably uncomfortable. "The first-class carriages are expensive, and the second-class are dangerous or detrimental to the health of passengers."[3] The through draught of air in the second-class was more especially fatal in the case of invalids, and was in the opinion of many even worse "than the general exposure to the air in the third class carriages, even with wet clothes." Many of the complaints sound a trifle ludicrous, such as the frequent colds in the head, and the loss by the third-class passengers of their hats "which could not be recovered," but the actual discomfort must have been acute, especially as these travelers were also exposed to the sparks from the engine, which not infrequently ignited their clothing.

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[1] Appendix, page 9.

The fares in England were also very high. While for longer distances, the cost of travel by coach, including sustenance, was considerably greater than by rail, the fares for short distances were frequently higher by the railroads than by the coaches that they had displaced. Thus the fare from Darlington to York had been three shillings by the common stage-wagon, and five shillings by rail; and a similar difference existed between the fares to Leeds, Newcastle and Sunderland.[4]

[1] Appendix to Report, p. 45.

[2] Page 56.

[3] Page 52.

[4] Page 58. Mr. Tweddle, who gives this evidence, goes so far as to say that "the change in the mode of traveling has very much restricted the means of communication at the disposal or the poorer classes."

The fares prevailing in England were certainly higher than those on the few lines that had been built on the Continent. In Belgium, where the average number of passengers per mile was about the same as in England, and the average length of the trip about as half as great again, the fare was only two-fifths of that of English railways.[1] The following table shows the average fare in cents per mile received in 1842 on Belgian and English railways:

	Belgium. Cents.	England. Cents.	Per Cent of English in Terms of Belgian Fares.
First Class	2.42	5.49	227
Second Class	1.82	3.31	182
Third Class	1.13	2.32	205
All Classes	1.41	3.43	243[2]

While the fares were two and one-half times as great in England as in Belgium, moreover the accommodations were in many cases worse, the third-class carriages being all open in England, whereas in Belgium, with the exception of those intended for passengers traveling short distances, not exceeding twenty miles, the third-class carriages were covered. The passenger fares established on the newly-opened German and French railways (notably the Paris and Orleans) were also considerably cheaper than the corresponding fares in England.

The Select Committee of 1844 recognized the evils existing in the passenger traffic and gave voice to them in their recommendations to parliament. After dwelling upon the probability of a wide extension of railway enterprises, and the necessity of, and present favorable opportunity for, safeguarding the interests of the general public, the committee draws attention to the prevalence of the "High-fare System." They also point to the poor prospect of a general reduction of fares by the various companies "even although it might be possible that that great experiment might be tried, if it were tried fully and universally, with no very unfavorable result, even upon immediate returns." The committee further recommended[1] "That the companies may be required to provide upon such new lines of railway, as a *minimum* of third-class accommodation, one train at least each way on every week-day, by which there shall be the ordinary obligation to convey such passengers as may present themselves at any of the ordinary stations, in carriages provided with seats and protected from the weather, at a speed not less than twelve miles an hour including stoppages, and at fares not exceeding a penny per mile; each passenger by such train being allowed not exceeding 56 pounds of luggage without extra charge, and extra luggage being charged by weight at a rate not exceeding the lowest charge by other trains; children under three years being conveyed without extra charge; and children from three to twelve years at half price."

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[1] Calculated from data furnished in Appendix to Report of 1844, p. 27.

[2] From this table it further appears that the Belgians chose the second and third class carriages more frequently than did the English.

This resolution was presented to parliament on the thirtieth of March, 1844, and by the ninth of August of the same year these recommendations had been embodied, with slight changes, in the Railway Clauses Act (7 and 8 Victoriæ, cap. 85.),[2] usually called the Cheap Trains Act. According to the act as finally passed, no cheap (or Parliamentary) trains need be run on Christmas Day or Good Friday, the trains must stop at every station, the Board of Trade are given a discretionary power of allowing certain other and equal concessions by the railways, and the whole of the passenger duty is remitted for cheap trains, instead of merely half of it being remitted, as contemplated by the report of the committee.

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[1] Third Report from the Select Committee on Railways, pp. 3, 166. Sec. II, p. 6.

[2] Public General Acts, VII and VIII Vict., 1844. London, 1844.

The result of the act was seen in the rapid expansion of the cheaper traffic, the number taking advantage of the new law being very great. While for England and Wales the number of passengers increased 16.33 per cent in the first class and 46.95 in the second, and actually decreased 2.25 per cent in the regular third class, from 1846 to 1850, there was an increase during the same period of 330 per cent in the parliamentary traffic.[1] By the year 1850 49.6 per cent of all passengers were carried either in third class or in parliamentary trains in England, 47.07 per cent in Scotland and 54.2 per cent in Ireland, a considerably higher percentage (72.4 per cent) having been reached in the latter country in 1848.

This increase in the "Parliamentary" was not entirely at the expense of the other classes. During this period the passenger traffic increased with considerable rapidity, and there is also to be observed an increase in the gross passenger receipts, although this is somewhat smaller, owing to the general cheapening of travel throughout the whole country. The following tables give the statistics of travel and of passenger receipts for the five years ending June 30, 1850:

NUMBER OF PASSENGERS.[2]

Year.	England and Wales.	Scotland.	Ireland.[3]	United Kingdom.[4]
1846	35,398,403	4,782,075	1,278,807	43,790,983
1847	41,560,342	5,943,525	1,609,345	51,352,163
1848	46,316,540	7,273,781	2,134,980	57,965,070
1849	46,745,033	7,733,498	2,449,727	60,398,159
1850	53,463,787	8,201,755	2,802,519	66,840,175

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[1] Report of the Commissioners of Railways for the year 1850. London, 1851, pp. 26, 27.

[2] Rep. 1850, pp. xxix and 364–5.

[3] Exclusive of the Dublin & Kingstown Railway.

[4] The returns for the United Kingdom are somewhat greater than for the three countries combined.

RECEIPTS IN £.[1]

Year.	England and Wales.	Scotland.	Ireland.	United Kingdom.
1846	£4,364,252	£255,493	£54,302	£4,725,216
1847	4,680,108	318,524	100,366	5,148,002
1848	5,091,018	417,821	162,388	5,720,382
1849	5,302;003	531,962	224,127	6,105,975
1850	5,588,569	563,361	266,971	6,465,576

In citing these figures, the Railway Commissioners point with great pride to "the extraordinary amount for the United Kingdom of 66,840,175 passengers," and while these figures are small compared to what have been since attained, the traffic on British railways was considerably greater than the contemporaneous traffic in any country on the Continent. The great bulk of the traffic was then, as now, in England and Wales proper, while Ireland lagged far in the rear. The per capita traveling was somewhat over three in England and Wales, somewhat under three in Scotland and about three-fourths in Ireland; but this backwardness of Ireland might be particularly attributed to the recent famine and to the youth of its railways, only fifty-five miles having been constructed before 1846. The traffic was consequently less dense in that island, there being in 1850 but 6,159 passengers carried per mile of Irish railways, compared to 9,917 on Scotch and 11,655 on English (and Welsh) railways.

Wherever the railway net of a country is rapidly increasing, there is apt to be a decrease in the receipts per mile for the passenger as well as for the freight traffic. While the receipts per mile increase for the roads already built, the accession of new lines to the existing net will inevitably bring down the average, and there is, moreover, a natural tendency for the more lucrative lines to be first constructed. All through the forties, and especially during certain portions of that decade, the increase of mileage was very rapid, amounting from 1846 to 1850 to 115 per cent for England and Wales, 199 per cent for Scotland and 727 per cent for Ireland. The passenger traffic could not keep pace with the increase, and we find, in consequence, a continous and rapid decrease in the number of passengers carried per mile.

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[1] Rep. 1850, pp. xxix and 364–5.

NUMBER OF PASSENGERS CONVEYED PER MILE.[1]

Year.	England and Wales.	Scotland.	Ireland.
1846	16,595	17,294	23,251
1847	15,760	17,795	13,933
1848	14,290	15,185	8,802
1849	11,998	11,372	6,891
1850	11,655	9,917	6,159

The passenger receipts per mile of railroad declined to an even greater extent than did the number of passengers carried; but the receipts from the freight traffic maintained their ratio, owing to this traffic absorbing a larger and larger part of the total revenue. When the railways were first constructed, it was found in almost every country that the passenger traffic played at first the predominant rôle. In this traffic the railways had little to fear from competition of other agents, and soon monopolized the business of transporting persons by land. The freight traffic, however, if somewhat more belated in birth, manifested eventually a greater elasticity and capacity for growth, and at the present time contributes in most countries the lion's share of railway revenue. The following table shows how early this decline in the proportion of passenger receipts to total receipts may be observed in the United Kingdom:

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[1] Rep. 1850, pp. xxv, xxvi, etc.

PROPORTION OF PASSENGER TO TOTAL FREIGHT RECEIPTS.

Year.	England and Wales.	Scotland.	Ireland.
1846	62.59 per cent.	54.37 per cent.	75.19 per cent.
1847	60.68 "	51.83 "	74.65 "
1848	57.17 "	55.07 "	73.88 "
1849	54.45 "	48.58 "	70.05 "
1850	52.32 "	44.95 "	62.80 "

The following statistics of the number of passengers of British and Irish railways have been obtained from the annual reports of the Board of Trade:

Year.	Number of Passengers (season-ticket travel not included).	Percentage of Increase Over Preceding Year.	Year.	Number of Passengers (season-ticket travel not included).	Percentage of Increase Over Preceding Year.
1849	63,841,539	...	1874	477,840,411	4.95
1850	72,854,422	...	1875	506,975,234	6.10
1851	85,391,095	...	1876	538,287,295	6.17
1852	89,135,729	...	1877	551,593,654	3.29
1853	102,286,660	...	1878	565,024,455	1.64
1854	111,180,165	...	1879	562,732,890	—0.40
1855	118,567,170	6.64	1880	603,885,025	7.31
1856	129,315,196	9.67	1881	626,030,000	3.67
1857	138,971,240	7.47	1882	654,838,295	4.60
1858	139,141,135	0.13	1883	683,718,137	4.41
1859	149,757,294	7.63	1884	694,991,860	1.65
1860	163,435,679	9.13	1885	697,213,031	0.32
1861	173,721,139	6.30	1886	725,584,390	4.07
1862	180,429,071	3.86	1887	733,678,531	1.12
1863	204.635,075	13.42	1888	742,499,164	1.20
1864	229,272,165	11.24	1889	775,183,073	4.40
1865	251,862,715	9.85	1890	817,744,046	5.49
1866	274,293,668	8.91	1891	845,463,668	3.39
1867	287,688,113	4.88	1892	864,435,388	2.24
1868	312,759,053	4.27	1893	873,177,052	1.03
1869	....	4.27	1894	911,412,926	4.38
1870	336,545,397	7.61	1895	929,770,909	2.01
1871	375,220,754	11.49	1896	980,339,433	5.44
1872	422,874,822	12.70	1897	1,030,420,201	5.11
1873	455,320,188	7.67	1898	1,062,911,116	3.16

In order to show more clearly the manner in which the passenger traffic of British railways has grown, a calculation has been made from the official statistics of the rate per cent of increase for each year from 1854 to 1894. The figures thus obtained show an astonishing regularity in the increase, a regularity to be observed in the growth of the passenger traffic of no other country. In no year was the rate of increase greater than 13½ per cent, and the sole decrease in the traffic during the whole forty years was one of less than one-half of one per cent. The regularity of this increase points to stable conditions, and perhaps, on the whole, to a conservative policy, and it is interesting to note that with each succeeding decade the regularity becomes greater, and the latitude of fluctuation less.

During the forty years ending in 1894 the number of passengers carried by British railways increased by 719 per cent, or at the rate of 5.4 per cent per annum. It is worthy of notice, however, that what is true of the railway mileage is equally true of the passenger movement on British railways, namely, that instead of increasing in a uniform geometrical ratio, the traffic has inreased at an ever-slackening rate. Thus the number of passengers on the railways of the United Kingdom increased from 1854 to 1864 by 118,092,000, from 1864 to 1874 by 248,568,449, from 1874 to 1884 by 217,151,499, and from 1884 to 1894 by 216,421,066.

From this it may be seen that the augmentation of the traffic from 1884 to 1894 was smaller than during the previous decade and considerably smaller than during the decade 1864–1874. The decline in the increase of traffic may be seen more clearly, however, if we consider, not the actual increase, not the increment itself, but the increase per cent. Thus there was an increase from 1854 to 1864 of 106.22 per cent; from 1864 to 1874 of 108.42 per cent; from 1874 to 1884 of 45.45 per cent, and from 1884 to 1894 of 31.17 per cent, in the total number of passengers, the season-ticket holders being, as before, disregarded. In other words, while the number of passengers more than doubled in each of the former two decades, the traffic did not even once double during the twenty years from 1874 to 1894. In the twenty years preceding 1874, the increase was 330 per cent; in the twenty years succeeding, it was but 91 per cent.

If the increase in the passenger traffic of Great Britain and Ireland continues to slacken, it is probable that within a few decades the number of travelers on British roads will be surpassed by that on German and American railways. While there were but 216 million additional passengers in the United Kingdom from 1884 to 1894, there was an increase during the same period of 235,000,000 (Poor) in the United States, and of 265,000,000 in Germany, and this difference becomes still more momentous when we remember that the number of passengers increased only 31 per cent in the United Kingdom as compared with 96 per cent in Germany and 70 per cent in the United States.

While there is a tendency for the increase in the British passenger traffic to diminish steadily, there seems to be still another law at work according to which the increase during the earlier part of the decade is considerably greater than during the latter part, as is to be observed from the following table:

Period.	Annual Increase. Per cent.	Period.	Annual Increase. Per cent.
I. 1855–59	6.14	II. 1860–64	8.89
III. 1865–69	6.42	IV. 1870–74	8.85
V. 1875–79	3.33	VI. 1880–84	4.31
VII. 1885–89	2.21	VIII. 1890–94	2.82

The next table shows the difference in the absolute increase during the same periods:

Period.	Annual Increase. Passengers.	Period.	Annual Increase. Passengers.
I. 1855–59	38,500,000	II. 1860–64	79,500,000
III. 1865–69	83,500,000	IV. 1870–74	165,100,000
V. 1875–79	84,900,000	VI. 1880–84	132,200,000
VII. 1885–89	80,200,000	VIII. 1890–94	136,200,000

From this it may be seen that the passenger traffic is from 55 per cent to 105 per cent greater in the early part of the decade than in the latter part of the preceding decade.

Taken in the aggregate, the passenger traffic upon British railways has increased at a fairly rapid pace. In 1894 there were eight times as many passengers as in 1854, and over fourteen times as many as in 1849. The population has by no means increased at an equal rate, and the number of railway trips per capita has rapidly increased.

Year.	Number of Trips per Capita.	Population Based upon Census of Year
1840	1.5	1841
1850	2.6	1851
1861	5.9	1861
1871	11.6	1871
1881	17.8	1881
1891	22.2	1891
1895	24.4	1891

At the rate of traveling prevailing in 1840, the population of the British Isles would have to be over six hundred millions to permit the present traffic. The present per capita travel there is considerably greater than that of any other country in Europe or America, but even as early as 1871 the per capita travel of the inhabitants of the United Kingdom was greater than the present per capita traveling in Germany, France, or the United States. At present there are 11.3 trips taken per head of the German (1895–6), 9.6 per head of the French (1895), and 8.2 per head of the American (1896) population; twenty-five years ago the per capita traveling in Great Britain and Ireland was already 11.6 trips.

While the passenger traffic of British railways has of late increased at a diminished rate, the receipts from the passenger traffic, owing to the smaller return per passenger, have increased still less rapidly. In the following table the receipts from the passenger branch of the service are given from 1854 to 1897:

Year.	Passenger Receipts.	Year.	Passenger Receipts.[1]
	£ Sterling.		*£ Sterling.*
1854	10,244,954	1890	34,327,965
1859	12,537,493	1891	35,130,916
1864	15,684,040	1892	35,662,816
1869	18,811,504	1893	35,849,449
1874	24,893,615	1894	36,495,488
1870	25,915,585	1895	37,361,162
1884	30,030,450	1896	39,120,865
1889	32,630,724	1897	40,518,064

From this table it is evident that the passenger receipts are not increasing with nearly the same rapidity as the number of travelers, the increase of the receipts of 1894 over those of 1854 being but 264.7 per cent compared to an increase in the number of travelers of per cent during the same period. The passenger receipts, moreover, are forming a smaller and smaller proportion of the total receipts, as will be shown in a later chapter.

It may not be without interest to trace the development of the passenger traffic in the various countries of which the United Kingdom is composed. No countries could be more dissimilar in their whole industrial development than

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[1] This includes, also, receipts for season-ticket travel, carriages, horses, etc., and mails.

England and Ireland, and it will, therefore, be advisable to consider separately the passenger traffic of England and Wales, of Scotland and Ireland.

The greatest proportion of railway traveling in the United Kingdom naturally takes place in England. With 77.4 per cent of the population it has 82.4 per cent of the total number of passengers. The following tables show the development of the traffic in England and Scotland:

STATISTICS OF PASSENGERS ON ENGLISH RAILWAYS.

Year.	Number of Passengers.	Per Cent of Increase.	Year.	Number of Passengers.	Per Cent of Increase.
1864	197,164,661	. .	1887	647,774,956	0.98
1874	423,083,941	. .	1888	654,172,918	1.00
1876	480,939,391	. .	1889	683,263,574	4.43
1877	492,404,036	. .	1890	721,114,781	5.54
1878	503,982,893	. .	1891	746,555,822	3.53
1879	503,652,787	. .	1892	762,630,966	2.15
1880	540,669,175	7.35	1893	769,344,215	0.88
1881	561,175,291	3.79	1894	804,140,008	4.51
1882	586,689,830	4.55	1895	816,921,056	1.59
1883	612,401,758	4.38	1896	860,080,304	5.28
1885	622,169,944	0.17	1897	898,060,971	4.42
1886	641,502,033	3.11			

The most noteworthy fact about these figures is the similarity in the development of the traffic in England and Scotland, and the small advance in the Irish traffic.

The Scotch traffic has developed in a manner somewhat different from that of the English railways. In its expansion we do not discover the great falling off in the rate of increase to be observed in the English passenger traffic. The annual rate of increase upon Scotch railways, from 1864 to 1874, was 6.58 per cent; from 1874 to 1884, was 3.57 per cent; from 1884 to 1894, was 4.30 per cent. It is true that the increase in the last decade was due to a sudden abnormal expansion of 16.88 per cent in 1886, and that from 1886 to 1894 the annual rate of increase was but 2.99 per cent, but the absolute increase certainly did not diminish. The annual increase during these periods were as follows: 1864 to 1874, 1,800,000 passengers; 1874 to 1884, 1,610,000 passengers; 1884 to 1894, 2,850,000 passengers; (1886 to 1894), (2,170,000) passengers. While the increase has thus been dissimilar from that of the English railways, the rate of increase during the last thirty years has been almost identical. From 1864 to 1894 the annual increase in the number of passengers was 4.80 per cent on English and 4.81 per cent on Scotch railways, despite the fact that the population of Scotland is increasing far less rapidly than that of England.[1]

STATISTICS OF PASSENGERS ON SCOTCH RAILWAYS.

Year.	Number of Passengers.	Year.	Number of Passengers.
1863	19,567,399	1883	52,031,527
1864	20,205,455	1884	54,305,074
1869	23,463,867	1885	55,922,425
1870	27,046,864	1886	65,362,092
1871	. . . . . .	1887	66,432,617
1872	34,097,183	1888	68,413,349
1873	37,512,796	1889	70,907,464
1874	38,220,892	1890	75,215,984
1875	39,068,932	1891	76,705,588
1876	39,991,641	1892	79,157,412
1877	41,922,872	1893	80,127,776
1878	43,160,416	1894	82,736,531
1879	42,677,706	1895	86,604,305
1880	45,956,833	1896	93,693,859
1881	47,211,449	1897	106,453,931
1882	49,424,477		

The traveling per head of population is thus increasing more rapidly in Scotland, as may be seen from the following table:

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[1] From 1851 to 1891 the population of Scotland increased 39.4 per cent; that of England 62.4 per cent.

TRIPS PER CAPITA.

Year.	England.	Scotland.	Population Based on Census of
1864	9.8	6.6	1861
1874	18.6	11.4	1871
1884	. . .	14.6	1881
1894	26.5	20.6	1891

While the passenger traffic of England and Scotland has been increasing with considerable rapidity, that of Irish railways has been from the first feeble and unimportant. In no European country has the traffic increased so slowly as in Ireland, the traffic increasing but 106.15 per cent in Ireland, compared with 307.86 per cent in England and 309.47 per cent in Scotland. In Ireland the increase has been slow, with many interruptions, and even this slow rate of increase is becoming slower, the increase during the period 1874–1894 being at a trifle under 2 per cent (1.99 per cent) per annum. The following table gives the number of passengers on Irish railways during recent years:

NUMBER OF PASSENGERS ON IRISH RAILWAYS.

Year.	Number of Passengers.	Year.	Number of Passengers.
1864	11,902,049	1884	19,555,598
1869	13,308,677	1885	19,120,665
1870	14,324,613	1886	18,720,265
1872	16,327,416	1887	19,470,958
1873	16,342,306	1888	19,912,897
1874	16,535,578	1889	21,012,035
1876	17,356,263	1890	21,413,281
1877	17,266,746	1891	22,202,258
1878	17,881,146	1892	22,647,010
1879	16,402,397	1893	23,715,061
1880	17,259,017	1894	24,536,387
1881	17,643,260	1895	26,245,548
1882	18,723,988	1896	26,565,270
1883	19,284,852	1897	25,905,299

The arrested development of the passenger traffic in Ireland is due in no small measure to the remarkable decline in the population of that country during the last fifty-five years.[1] But even this decline does not entirely account for the small increase in traffic, which is ascribable to adverse economic conditions, and, in the opinion of many railroad men, to a mistaken railway policy. The influence of the decline in population can be eliminated by considering the growth of the per capita traveling, as follows:

Year.	Number of Trips per Head of Population.	Based on Census of
1864	2.1	1861
1874	3.0	1871
1884	3.8	1881
1894	5.3	1891

The receipts from the passenger traffic have increased, however, more rapidly than the railway mileage; the receipts per mile in dollars. (£=$4.87).

Year.	Dollars per Mile.
1854	$6,195
1864	5,972
1874	7,370
1884	7,753
1894	8,501

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[1] The population of Ireland was as follows at the following census years:

Year.	Population.	In Proportion to that of the United Kingdom. Per Cent.
1841	8,175,124	30.2
1851	6,552,385	23.7
1861	5,798,564	19.8
1871	5,412,377	17.0
1881	5,174,836	14.6
1891	4,704,750	12.5

CHAPTER IX.

PASSENGER TRAFFIC OF CONTINENTAL RAILWAYS.

Despite the fact of its greater area, France has had a much slower railway development than the United Kingdom. Until the middle of the sixth decade, the extension of railways in France was quite slow, only 641 miles having been constructed by 1846, and but 3,687 miles by 1856. (In 1896, 22,649).[1] The development of the passenger traffic was, therefore, far slower than in Great Britain. From 1845 to 1854 the British railways carried from four to five times as many passengers as did those of France; as late as 1866 the number of passengers was over three times as great on British as on French railways, while at the present time there are over ten passengers on British railways (not including season-ticket holders) for every four on French railways. The number of passengers carried on the French railways of public interest has increased from 6.4 millions in 1841 to 10.4 millions in 1846, 19.9 millions in 1851, 36.4 millions in 1856, 61.9 millions in 1861, 87.3 millions in 1866, 95.7 millions in 1871, 137.0 millions in 1876, 179.8 millions in 1881, 216.6 millions in 1886, 255.7 millions in 1891 and 385.0 millions in 1896.

The per capita traveling[2] has increased from 0.2 trips per capita in 1841 to 0.3 in 1846, 0.6 in 1851, 1.1 in 1856, 1.7 in 1861, 2.3 in 1866, 2.7 in 1871, 3.7 in 1876, 4.8 in 1881, 5.7 in 1886, 6.7 in 1891 and 10.0 in 1896.

The following table shows the development of number of passengers in Prussia. In 1844 there were 3.9 millions of passengers on Prussian railways: 3.9 millions in 1846, 9.3

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[1] This includes the railways d'interêt général only.

[2] Population is taken at that of the last census year, except in the case of 1871, where census year 1872 is taken.

millions in 1851, 15.5 millions in 1856, 23.4 millions in 1861, 38.0 millions in 1866, 76.0 millions in 1871, 116.4 millions in 1876, 124.4 millions in 1880–81, 170.6 millions in 1885–86, 274.7 millions in 1890–91 and 522.3 millions in 1898–99. From this may be seen how rapid has been the growth of the passenger traffic in Prussia, a growth commensurate with that of the country itself. In 1846 the number of passengers conveyed on French railways was over 160 per cent greater than that on Prussian (not all German) railways; in 1856 it was 135 per cent greater, in 1866 130 per cent greater, in 1876 only 18 per cent greater.

The per capita traveling has increased from 0.3 in 1844 and in 1846 to 0.7 in 1851, 1.2 in 1856, 1.3 in 1861, 2.1 in 1866, 3.2 in 1871, 4.5 in 1876, 4.6 in 1880–81, 6.0 in 1885–86, 9.2 in 1890–91 and 10.0 in 1898–99.

The French passenger traffic has not grown so rapidly as that of Germany owing, largely, to the smaller increase in population. Its development, however, has not been slow, and especially has this been the case since 1892. From 1841 to 1869 the increase in the traffic was very rapid, averaging 9.33 per cent per annum from 1841 to 1848, 15.65 per cent from 1848 to 1855, 10.22 per cent from 1855 to 1862 and 7.95 per cent from 1862 to 1869, the total increase from 1841 to 1868 being 1642.73 per cent, or 10.75 per cent per year. The disastrous war of 1870–71 caused a decline in the passenger traffic, and during these two years the travel was considerably smaller than in 1869. The imposition of the additional duty upon the passenger traffic also tended to diminish the rate of increase, and from 1872 to 1880 the rate of increase was only 5.03 per cent as compared with 10.75 per cent before, while from 1880 to 1887 it was only 4.03 per cent per annum, the increase, however, being quite steady. The years 1867, 1878 and 1889 were marked by a great increase in travel owing to the expositions then held. Since

1887 the traffic has increased quite rapidly. Especially has this been the case since 1892, when the state abolished the *impôt additionel* or supplementary tax, and the railroads made corresponding reductions in fares.

During the last forty years the per capita traveling of the French nation has increased almost tenfold.

Year.	No. of Trips.	Population.	Year of Census.	Trips per Inhabitant.
1855	32,941,471	34,230,178	1841	1.0
1860	56,528,613	34,230,178	1841	1.7
1865	81,533,061	37,386,313	1861	2.2
1870	102,597,839	38,067,064	1866	2.7
1875	131,311,803	36,102,921	1872	3.6
1880	165,105,603	36,905,788	1876	4.5
1885	214,450,555	37,672,048	1881	5.8
1890	241,118,706	38,218,903	1886	6.3
1895	344,852,096	38,34-,948	1891	9.1

The total passenger traffic on all French railways amounted to 396.7 millions of passengers in 1897.

The development of the passenger traffic of French railways during the last fifty-six years has been as follows:

Year.	No. of Passengers.	Year.	No. of Passengers.	Year.	No. of Passengers.
1841 . .	6,378,666	1860 . .	56,528,613	1879 . .	150,525,733
1842 . .	6,207,936	1861 . .	61,924,634	1880 . .	165,105,603
1843 . .	7,351,883	1862 . .	65,080,345	1881 . .	179,729,597
1844 . .	8,139,488	1863 . .	70,199,282	1882 . .	194,892,097
1845 . .	8,865,118	1864 . .	75,351,531	1883 . .	207,171,029
1846 . .	10,424,766	1865 . .	81,533,061	1884 . .	211,893,225
1847 . .	12,777,923	1866 . .	87,342,011	1885 . .	214,450,555
1848 . .	11,907,425	1867 . .	101,610,748	1886 . .	216,648,915
1849 . .	14,811,665	1868 . .	102,857,116	1887 . .	217,774,876
1850 . .	18,741,415	1869 . .	111,163,584	1888 . .	224,801,159
1851 . .	19,936,399	1870 . .	102,597,839	1889 . .	244,164,701
1852 . .	22,609,923	1871 . .	95,680,233	1890 . .	241,118,706
1853 . .	24,685,320	1872 . .	111,505,569	1891 . .	255,671,898
1854 . .	28,070,458	1873 . .	116,546,175	1892 . .	288,077,679
1855 . .	32,941,471	1874 . .	121,117,208	1893 . .	317,819,027
1856 . .	36,377,054	1875 . .	131,311,803	1894 . .	336,544,148
1857 . .	41,616,844	1876 . .	136,987,618	1895 . .	344,852,096
1858 . .	45,363,768	1877 . .	138,826,539	1896 . .	363,009,306
1859 . .	52,405,021	1878 . .	152,806,132		

The following table shows the total traffic measured in passenger kilometres for the last fifty years:

Year.	Passenger Kilometres (millions).	Year.	Passenger Kilometres (millions).
1843	185.5	1869	4,107.4
1844	232.4	1874	4,445.8
1849	555.1	1879	5,253.5
1854	1,392.3	1884	6,882.7
1859	2,706.1	1889	8,627.8
1864	3,161.0	1894	10,330.6

The passenger density (number of passenger miles per mile of road) has fluctuated very violently, but, on the whole, has shown a tendency to increase. The freight density increased far more rapidly until the early eighties, but has since shown a tendency to decline.

Year.	Passenger Density (passenger miles divided by miles of road). (000)	Freight Density (tons[1] miles divided by miles of road). (000)	Year.	Passenger Density (passenger miles divided by miles of road). (000)	Freight Density (tons[1] miles divided by miles of road). (000)
1843	225	71	1869	249	381
1844	282	100	1870	274	325
1845	282	113	1871	282	339
1846	232	99	1872	240	429
1847	235	119	1873	234	439
1848	195	85	1874	237	422
1849	194	86	1875	241	420
1850	245	104	1876	247	415
1851	229	102	1877	237	398
1852	256	143	1878	269	391
1853	285	201	1879	235	404
1854	300	246	1880	254	448
1855	329	274	1881	260	448
1856	298	301	1882	264	423
1857	269	287	1883	263	414
1858	243	276	1884	239	364
1859	299	301	1885	235	328
1860	271	353	1886	232	303
1861	269	381	1887	229	315
1862	257	350	1888	228	323
1863	250	339	1889	262	335
1864	242	355	1890	238	354
1865	238	382	1891	245	362
1866	235	403	1892	266	349
1867	274	373	1893	284	348
1868	245	397	1894	287	347

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[1] Metric tons of 2204 pounds.

The great bulk of the passenger traffic of Germany is, naturally, found in Prussia, and from Prussian statistics we can obtain a fairly accurate idea of the development of the traffic in the whole empire. The subjoined table shows a remarkable, if somewhat late, development of the Prussian passenger traffic. Like Prussian history itself, the development of the passenger traffic suffers a considerable break after the war of 1866 owing to the increase of territory. From 1844 to 1867 there is a rapid rise in the number of travelers, the annual increase being, from 1844 to 1852, 11.93 per cent, from 1852 to 1860 10.54 per cent, and from 1860 to 1867 8.68 per cent, which is equivalent to an annual increase of 10.45 per cent for the whole period. In the year 1867 the Prussian network increased through the absorption of the railways in the newly-conquered provinces, and the passenger traffic of 1868 is, in consequence, 45.97 per cent greater than that of the previous year. From 1868 to 1875 the traffic again increases with remarkable rapidity, the annual increase equaling 10.72 per cent per annum, but from 1875 to 1879 the reaction observed in other countries sets in, and there is no advance, their being, in fact, a slight decline during the period of 0.22 per cent per annum. From 1879 on there is a rapid increase (though not so rapid as that of the early seventies), and the traffic increases at the rate of 7.81 per cent during the years 1879–92.

PASSENGER SERVICE IN PRUSSIA.

Year.	No. of Passengers.	Year.	No. of Passengers.
1844	3,940,904	1851	9,288,096
1845	4,006,814	1852	9,707,198
1846	3,908,701	1853	10,191,587
1847	5,829,412	1854	11,807,755
1848	7,886,888	1855	12,729,837
1849	8,597,948	1856	15,474,986
1850	9,241,780	1857	18,414,094

PASSENGER SERVICE IN PRUSSIA—*Continued.*

Year.	No. of Passengers.	Year.	No. of Passengers.
1858	19,159,327	1876	116,452,115
1859	20,161,218	1877	114,804,613
1860	21,641,083	1878	113,792,434
1861	23,367,218	1879	114,402,292
1862	25,928,393	1880-1	124,383,963
1863	29,198,122	1881-2	131,756,385
1864	32,001,266	1882-3	147,120,532
1865	34,897,800	1883-4	160,231,393
1866	38,049,367	1884-5	172,333,849
1867	38,766,866	1885-6	170,553,368
1868	56,588,244	1886-7	185,120,178
1869	61,949,816	1887-8	191,674,616
1870	66,446,297	1888-9	207,857,296
1871	75,958,444	1889-90 . . .	235,134,714
1872	86,442,679	1890-1	274,733,883
1873	99,629,719	1891-2	303,949,780
1874	109,570,671	1896-7 . . .	436,717,857
1875	115,343,065	1898-9	522,278,722

The passenger traffic of Prussian railways has increased at a considerably greater rate per cent than that of the British railways. While the British passenger traffic increased 5 per cent per annum during the fifty years ending 1894, that of Prussia increased at the rate of 8.98 per cent during the years 1844–1892. But the actual increase on the British railways has been considerably greater, the higher percentages on Prussian railways being due to the low development of the traffic in the forties and fifties. The growth of the per capita traveling on Prussian railways at various periods has been already treated.

In Saxony the passenger traffic is denser than in Prussia, and the development since 1870 has been more rapid. As is indicated in the accompanying tables, the increase in the passenger traffic was exceedingly rapid during the decade ending 1880, and more particularly so during the earlier part of the decade. The number of passengers increased considerably more rapidly than the railway mileage, railway capital or than the population of the country, the per capita traveling being shown in the following table.

PASSENGER TRAFFIC ON ROYAL SAXON RAILWAYS.

Year.	No. of Passengers.	Per Cent of Increase.	Annual Rate of Increase.
1850	709,594	. . .	. . .
1860	3,400,000	279.0	16.96
1870	5,900,000	63.5	5.01
1880	18,400,000	211.9	12.02
1890	33,600,000	82.6	6.17
1880	18,461,212	. .	. . .
1881	18,548,252	0.47	0.47
1882	19,599,531	5.67	5.67
1883	20,385,266	4.01	4.01
1884	21,601,959	5.97	5.97
1885	23,028,599	6.60	6.60
1886	24,381,072	5.87	5.87
1887	26,563,894	8.95	8.95
1888	26,886,259	8.74	8.74
1889	31,046,704	7.48	7.48
1890	33,632,845	8.33	8.33
1891	34,936,592	3.88	3.88
1892	35,811,211	2.50	2.50
1893	37,789,770	5.52	5.52
1894	40,272,744	9.21	9.21
1895	42,280,765	5.00	5.00
1896	47,350,323	11.99	11.99
1897	52,606,214	11.10	11.10
1898	59,832,586	13.74	13.74

THE PER CAPITA TRAVELING IN SAXONY.

Year.	Per Capita Traveling.	Census of
1850	0.4	1846
1860	1.7	1855
1870	2.5	1864
1880	6.1	1880
1885	7.3	1885
1890	9.5	1890
1893	10.8	1890
1898	15.8	1897

During the last half century the receipts from the passenger traffic on Saxon railways increased as follows:

Year.	Marks.	Year.	Marks.
1847	583,223	1876	16,887,491
1851	1,978,431	1881	17,426,903
1856	2,914,134	1886	21,010,317
1861	4,111,426	1891	27,066,538
1866	4,025,160	1898	38,357,026
1871	9,218,673		

During the forty-five years, 1847–91, the receipts from the passenger traffic averaged 10,386,221 marks (4.67 millions in all) as compared with an annual average of 24,618,927 marks from freight.

The receipts from the passenger traffic have increased rapidly, the small receipts for 1859, 1866 and 1870–1 being due to the wars then carried on. The passenger receipts, however, have grown less rapidly than those from the freight traffic.

In Württemberg the railways very early attracted a considerable traffic. Especially was this true of the passenger traffic.[1] As early as 1851–2 there was a passenger density of 151,316, and in 1854–5 of 135,489, despite the comparatively high fare of 1.59 cents per passenger per mile. The passenger density increased steadily to 245,511 in 1860–1, a decline then ensuing, owing, partly, to the rapid construction of new lines, a passenger density of 210,057 being reached in 1864–5. In that year, when there were something over 340 miles of line constructed, the number of passengers was 5,048,476; the average distance traveled, 14.34 miles, and the average fare, which had been 1.59 cents in 1854–5, had now declined to 1.47 cents. The year 1861–2 was the most profitable year that the railways of Württemberg had ever enjoyed, but this success encourged the construction of roads at a too rapid rate. It is true that the passenger density continued to increase until 1866–7, reaching 244,769 in that year. The building of new lines, however, often through very thinly populated districts, brought the passenger density down to 150,102 in the "Kriegsjahr," 1870–1, but the return of peace and the increased prosperity of the country caused the traffic to rise rapidly again, reaching, in 1872–3, 191,670 passenger miles per mile of road. The average fare continued to decline, it being only 1.40 cents per passenger mile in 1872–3.

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[1] Jacob (Oskar), Die Köiglichen Württembergschen Staatseisenbahnen in historischstatistischer Darstellung, Tübingen, 1895.

At present Württemburg may be said to have a highly-developed passenger traffic. With a population of about 2,100,000 (2,081,151 in December, 1895), it had, in 1894, a passenger traffic of 20,444,935, or 10 per head of population, which is slightly larger than for the rest of Germany, though smaller than that of England, Belgium or our Eastern States. Its development was not a regular one, however, as in the case of the English traffic. Thus, the traffic in 1855 was less than that of 1854; that of 1874 less than that of 1873, while the traffic for 1877 was greater than that for any year from 1878 to 1883 inclusive, etc. From 1852 to 1875 the development was rapid, amounting to 641.56 per cent, or 8.42 per cent per year. But a serious reaction then followed, accompanying the industrial depression, and the traffic remained for a long time under the level of 1875, and then recuperated but slowly, the average annual increase from 1875 to 1890 amounting to but 2.24 per cent as compared with 8.42 per cent in the earlier period. From 1891 to 1894 the increase has been rapid (5.98 per cent per year), but the whole increase from 1875 to 1894 is equal to but 3.07 per cent per annum, owing to the stationary character of the traffic during the years 1875–85, when the percentage of increase was only 1.3 per cent. The receipts from the passenger traffic show a similar movement; a rapid increase from 1846 to 1875, a ten years' pause and then an accelerating recuperation. The following tables, taken from a recent able book[1] upon the Württemberg railways, show the development of the number of passengers, the number of passenger-kilometres and the passenger receipts from the Württemberg railways:

NORWAY.

Year.	Number of Passengers.	Passenger Kilometres.	Receipts per Passenger Kilometre. ore.
1855	128,000	. . . .	. . .
1856	161,000	5,160,000	3.1
1857	174,000	5,769,000	3.0
1858	168,000	5,463,000	3.0
1859	170,000	3,702,000	3.0
1860	152,000	4,782,000	3.3
1861	142,000	5,185,000	3.2
1862	160,000	5,675,000	3.1
1863-6[2]	319,000	10,792,000	3.0
1867	386,000	13,459,000	2.7
1868	388,000	13,829,000	2.8
1869	613,000	19,418,000	2.6
1870	551,000	17,294,000	2.6
1871	584,000	18,580,000	2.7
1872	771,000	23,463,000	2.8
1873	1,579,000	46,395,000	2.7
1874	1,653,000	45,520,000	2.9
1875	1,541,000	43,262,000	3.2
1876	1,458,000	41,320,000	3.3
1877	1,405,000	40,984,000	3.4
1877–8[3]	608,000	18,888,000	3.5
1879	1,373,000	43,715,000	3.5
1880	1,648,000	50,644,000	3.3
1881	1,800,000	55,865,000	3.2
1882	2,334,000	72,001,000	3.2
1883	2,709,000	83,720,000	3.2
1884	3,162,000	93,276,000	3.2
1885	3,129,000	88,921,000	3.2
1886	3,147,000	92,004,000	3.2
1887	3,216,000	92,649,000	3.2
1888	3,197,000	91,653,000	3.3
1889	3,622,000	98,673,000	3.2
1890	3,989,000	106,858,000	3.2
1891	4,334,000	117,133,000	3.1
1892	4,680,000	125,879,000	2.9
1893	5,686,000	134,076,000	2.8
1894	6,021,000	137,765,000	2.8
1895	6,335,000	146,045,000	2.8
1896	6,773,000	160,124,000	2.7
1897	7,350,000	172,258,000	2.7
1898	8,222,000	196,726,000	2.7

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[1] Supper. Die Entwickelung des Eisenbahnwesens im Konigreich Wurttemberg. Stuttgart, 1895.

[2] Average.

[3] For portion of year.

WÜRTTEMBERG.

Year.	Number of Passengers.	Number of Passenger Kilometres.	Baggage and Passenger Receipts. Marks.	Year.	Number of Passengers.	Number of Passenger Kilometres.	Baggage and Passenger Receipts. Marks.
1846	. . . .	. . . .	73,769	1873	9,318,841	215,440 682	8,356,800
1847	. . . .	. . . .	293,666	1874	9,249,267	222,031,170	8,713,233
1848	. . . .	. . . .	549,090	1875	11,066,369	242,848,818	9,387,936
1849	. . . .	. . . .	760,519	1876	11,079,530	245,967,472	9,476,924
1850	. . . .	. . . .	853,342	1877	11,349.978	251,407,733	9,755,620
1851	. . . .	. . . .	1,343,940	1878	10,582,995	243,353,114	9,502,850
1852	1,752,467	37,853,287	1,338,490	1879	7,564,118	175,448,632	6,863,904
1853	1,849,401	39,947,061	1,338,435	1880	10,039,147	244,949,859	9,109,729
1854	1,965,137	48,145,856	1,696,572	1881	10,594,486	249,542,132	9,233,348
1855	1,893,323	41,355,485	1,779,772	1882	10,745,646	268,340,810	9,823,224
1856	2,079,568	51,115,781	1,928,148	1883	10,388,941	252,478,181	9,302,656
1857	2,306,751	54,992,943	2,069,649	1884	11,373,804	270,078,557	9,371,924
1858	2,636,408	62,851,967	2,258,892	1885	11,422,935	276,173,497	9,533,501
1859	2,742,936	68,436,253	2,472,321	1886	12,170,362	280,708,588	9,850,273
1860	3,042,687	74,789,246	2,671,191	1887	12,754,472	288,107,151	9,993,742
1861	3,146,312	82,024,354	2,986,086	1888	13,416,936	296,572,917	10,296,040
1862	3,805,558	100,615,954	3,619,950	1889	13,984,255	307,186,234	10,768,484
1863	4,482,797	111,845,785	4,152,792	1890	15,220,423	333,200,383	11,435,061
1864	4,695,581	113,633,060	4,221,453	1891	15,829,279	348,659,497	12,181,173
1865	5,046,476	116,569,311	4,410,600	1892	17,592,078	363,192,046	12,188,631
1866	5,444,603	127,349,269	4,750,671	1893	19,189,684	403,323,348	12,651,886
1867	5,635,821	146,587,704	5,013,690	1894	20,444,935	427,442,576	13,456,713
1868	5,902,679	142,903,859	5,317,086	1895	20,390,342	410,997,111	13,441,349
1869	6,197,323	135,287,561	5,650,977	1896	24,210,427	470,463,685	14,401,910
1870	7,089,981	153,710,788	6,425,196	1897	24,977,558	487,994,065	15,225,802
1871	7,212,031	160,107,088	6,751,551	1898	28,095,153	534,004,044	15,957,648
1872	8,330,173	198,415,042	8,169,855				

Year 1846—July 1, 1845, to June 30, 1846. Year 1879—July 1, 1878, to March 31, 1879. Year 1880—April 1, 1879, to March 31, 1880.

The passenger traffic of Norway has been marked by a rapid increase in the total traffic, a decline followed by an advance in the length of the trip, and a very slight decrease in the receipts per passenger mile.

Switzerland is a country which has a very intense passenger traffic, and in which the railroads depend for a great portion of their business upon the conveyance of persons. In this country also, the passenger traffic has developed with quite as much rapidity as has the freight business. The increase in the traffic on Swiss railways from 1870 to 1890 amounted to 200 per cent for the passenger and 199 per cent for the freight business. In few countries, moreover, can the stimulating effect of the industrial activity of the early seventies upon both the passenger and the freight traffic be so clearly observed, as well as the effect of the depression of the latter part of the decade upon this traffic. From 1870 to 1875 the passenger traffic almost doubled, increasing 99 per cent, while during the period from 1875 to 1880 the increase was only a trifle over 1 per cent. The traffic then slowly increased, the increase amounting to 12 per cent from 1880 to 1885, and 34 per cent from 1885 to 1890.

The following table shows the comparative increase in the traffic from 1870 to 1897:

PASSENGER AND FREIGHT TRAFFIC ON SWISS RAILWAYS.

Year.	No. of Passengers.	Increase per Cent.	No. of Passengers per Capita.	No. of Tons Transported (including baggage and cattle).
1870	10,773,000	. .	4.0	3,145,000
1875	21,318,000	99	8.0	5,756,000
1880	21,608,000	1	7.6	5,817,000
1885	24,182,000	12	8.5	7,492,000
1890	32,378,000	34	11.1	9,390,000
1895	45,383,677	40	15.6	11,133,000
1897	52,958,694	. .	17.0[1]	13,050,000

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[1] Based on population of census of June, 1898.

As indicative of the gradual and steady development of passenger traffic in Switzerland, the following table is presented of the traffic of the United Swiss Railways (Vereinigte Schweizerbahnen).[1] This railway comprised a net of 171 miles in 1860, and of 177 miles in 1897, and its passenger traffic has developed as follows:

Year.	No. of Passengers.	Year.	No. of Passengers.
1860	1,603,430	1879	3,312,878
1861	1,691,592	1880	3,253,305
1862	1,754,167	1881	3,300,221
1863	1,798,891	1882	3,318,438
1864	1,810,301	1883	3,522,263
1865	1,873,300	1884	3,602,072
1866	1,826,052	1885	3,638,692
1867	1,848,415	1886	3,711,014
1868	1,916,915	1887	3,704,246
1869	2,011,679	1888	3,778,209
1870	2,041,754	1889	3,926,707
1871	2,364,235	1890	4,101,576
1872	2,650,079	1891	4,194,911
1873	2,802,544	1892	4,266,994
1874	3,124,312	1893	4,351,189
1875	3,411,657	1894	4,448,216
1876	3,546,139	1895	4,634,099
1877	3,398,949	1896	4,771,811
1878	3,309,827	1897	4,880,620

Passing to a country which differs from Switzerland in area, in size and character of population and in geographical situation, namely, to Sweden, we find a very similar development of the passenger traffic. Sweden is an agricultural country with meagre travel. From 1865 to 1870, the traffic of Swedish railways rapidly increased, the percentage being 69.5 per cent, but even this high rate of increase was surpassed in the half-decade, 1870–5, when the percentage of increase was 161.0 per cent. From 1875 to 1880, however, the traffic increased slowly, the rate being only 7.3 per cent for the five years. From 1880 to 1885, and from 1885 to 1890, the passenger traffic again increased, the percentage of increase being 38.7 per cent in the former and 31.0 per cent in the latter period. The rapidly increasing population did not nearly keep pace with this growth in the traffic, and we find the per capita travel of the Swedish population increased from 0.4 in 1865 to 2.7 in 1890. The following table shows the increase in the traffic on Swedish railways:

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[1] Vereinigte Schweizerbahnen. Forty-first Report. St. Gallen, 1898.

Year.	No. of Passengers.	Increase per Cent.	Per Capita Traveling, based on	Census of
1865	1,466,497	. . .	0.4	1860
1870	2,484,621	69.5	0.6	1870
1875	6,538,604	161.0	1.6	1870
1880	7,018,764	7.3	1.5	1880
1885	9,686,638	38.7	2.1	1880
1890	12,693,790	31.0	2.7	1890

In 1896 there was a total passenger traffic of 20,359,639, of which 12,630,720 were on private and 7,728,919 on state railways. In 1897 the number of passengers on state railways had increased to 8,521,784.

The passenger traffic of Belgium is more dense than that of any country on the continent of Europe. In 1896 there were 83,676,592 passengers on the state roads and 24,155,216 on privately owned railways. In other words there were 106,831,808 railroad trips for a population of 6,410,783, or an average of 16.7 trips per capita. The following table shows the development of the passenger traffic on the state roads in Belgium:

Year.	No. of Passengers.	Length of Line. Kilometres.
1835	421,439	13
1840	2,199,319	325
1845	3,470,678	560
1848	3,638,965	595
1857	6,458,424	745
1860	7,412,361	747

Years.	No. of Passengers.	Length of Line. Kilometres.
1865	10,677,963	749
1870	14,134,356	869
1875	34,961,012	1,966
1880	43,032,882	2,702
1885	51,233,224	3,144
1890	64,228,892	3,220
1896	82,676,592	3,330
1897	91,359,843	3,340

The passenger traffic of Russian railways is still very poorly developed. The total traveling of the immense empire equals but one-half of one trip per capita, and hitherto the development has been by no means rapid. In 1870 there were 14.4 millions of trips taken upon Russian railways; by 1880 the number had increased to 33.7 millions, and since 1880 the development has been as follows:

1881	34,439,332
1882	37,209,842
1883	37,561,107
1884	37,799,147
1885	37,585,945
1886	37,884,601
1887	38,159,092
1888	42,966,255
1889	45,005,162
1890	46,504,675
1892	49,353,000
1893	51,524,000
1894	55,632,000
1895	60,823,000
1896	68,348,000

In comparison to the population this is a most insignificant traffic and one which is capable of immense development. In proportion to the length of line already constructed, it is also very insignificant. It must be remembered, however, that these trips are far larger than in most of the other countries considered.

The Dutch lines have increased their traffic as follows during the last decade and a half:[1]

Year.	Number of Passengers.	Passenger Kilometres.	Passenger Density.
1879	13,374,000	420,751,000	232,000
1880	14,538,000	454,499,000	250,000
1881	15,205,000	469,482,000	245,000
1882	15,827,000	486,733,000	245,000
1883	16,024,000	542,099,000	271,000
1884	16,767,000	553,908,000	258,000
1885	16,645,000	542,691,000	255,000
1886	16,810,000	546,851,000	230,000
1887	17,697,000	567,053,000	234,000
1888	18,482,000	580,721,000	238,000
1889	19,450,000	633,403,000	244,000
1890	16,970,000	544,736,000	321,000
1891	22,185,000	639,884,000	216,000
1892	22,474,000	648,004,000	221,500
1893	23,539,000	694,432,000	235,000

Since 1893 the Dutch traffic has developed as follows: 1894, 24,387,000; 1895, 25,308,000; 1896, 24,782,000; 1897, 25,022,000; 1898, 26,034,000. Of these 26,034,000 passengers 10,828,000, or 41 per cent, were carried by the state, and 15,206,000, or 59 per cent, by private railways.

In 1873 the traffic amounted to 9,350,000, or 2.6 per capita; in 1880 it was 3.6; in 1888, 4.1, and in 1895 (25,-308,000), 5.2 trips per capita.

The statistics of the Dutch State Railway system (Maatschappij tot exploitatie van Staatsspoorwegen) throw light upon the earlier development of the passenger traffic in Holland.

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[1] "Jaarcijfers uitgegeven door de Centrale Commissie voor de Statistiek." Gravenhenge, 1894.

HOLLAND STATE RAILWAY.

Year.	Length in Kilometres.	Number of Passengers.	Passenger Receipts. Guilders.
1865	295	619,941	345,203
1876	998	3,697,906	3,619,970
1880	1,048	4,378,738	4,471,726
1885	1,389	5,049,665	5,861,982
1886	1,432	4,981,406	5,893,444
1887	1,456	5,356,377	6,016,382
1888	1,464	5,866,494	6,219,414
1889	1,468	6,181,491	6,465,958
1890	1,595	6,654,813	7,059,392
1891	1,595	11,110,639	8,862,895

The development of the passenger traffic of Austrian railways was quite slow until 1888, the traffic having increased less than 70 per cent during the twelve years from 1876 to 1888, and the receipts from the passenger traffic less than 30 per cent during this period. Since 1888, however, and especially since 1890, the development in the traffic has been rapid in the extreme, and while the reductions in fare, which contributed to this result, have caused the revenues to increase more slowly, there has still been an increase of over 40 per cent in the passenger revenues from 1888 to 1895. The following table shows the development of the passenger traffic of the whole Austrian system and of the state lines separately, as well as of the passenger receipts of the state and of all Austrian railways. (See page 129.)

The passenger traffic on Austrian railways is and has been far less important than the freight traffic, but both the passenger receipts and the number of passengers carried have increased more rapidly during the period 1876–1895 than the freight receipts and the number of tons carried. The passenger receipts increased, during the period 1876–1895, 80.4 per cent (from 33.09 to 59.70 millions of guilders), the freight receipts only 71.4 per cent (107.00 to 183.39 million guilders);

PASSENGER TRAFFIC AND RECEIPTS IN AUSTRIA.

Year.	Number of Passengers.		Receipts in Guilders.	
	All Railways.	State Railways.	All Railways.	State Railways.
1876	32,560,000	360,000	33,090,000	290,000
1877	30,120,000	460,000	33,080,000	410,000
1878	30,400,000	790,000	33,200,000	530,000
1879	30,650,000	1,170,000	32,450,000	610,000
1880	31,550,000	2,700,000	34,020,000	2,150,000
1881	33,250,000	2,830,000	34,950,000	2,190,000
1882	37,350,000	8,590,000	36,890,000	6,710,000
1883	42,320,000	11,050,000	38,120,000	7,240,000
1884	46,110,000	16,270,000	39,120,000	11,410,000
1885	49,300,000	18,170,000	39,950,000	12,250,000
1886	52,190,000	18,140,000	39,920,000	12,550,000
1887	52,620,000	18,240,000	40,730,000	12,430,000
1888	54,960,000	19,040,000	42,830,000	13,180,000
1889	59,540,000	21,600,000	46,190,000	16,160,000
1890	69,450,000	28,090,000	47,980,000	16,620,000
1891	83,100,000	34,670,000	49,190,000	17,300,000
1892	90,300,000	39,300,000	48,800,000	19,800,000
1893	94,970,000	38,890,000	51,910,000	20,960,000
1894	102,900,000	42,230,000	56,100,000	23,170,000
1895	106,440,000	44,330,000	59,700,000	26,040,000
1896	105,201,000	43,122,000	61,772,000	27,263,000
1897	109,461,000	44,002,000	63,399, 000	27,925,000

"Hauptergebnisse der oesterreichischen Eisenbahn-Statistik." Vienna, 1897. Brought down to date.

the number of passengers carried increased 226.9 per cent (from 32.56 to 106.44 millions), the number of tons (metric) carried increased only 144 per cent (from 38.47 to 93.88 millions).

The following table shows the passenger density (passenger miles divided by miles of line) and the average distance carried, as well as the passenger receipts per kilometre, upon the Austrian State Railways from 1888 to 1897:

PASSENGER DENSITY, LENGTH OF TRIP, ETC., ON AUSTRIAN STATE RAILWAYS.

Year.	Passenger Density.	Length of Trips. Kilometres.	Passenger Receipts per Kilometre. Guilders.
1888	124,930	36.64	2,429.24
1889	128,298	38.57	2,551.73
1890	165,447	38.98	2,520.10
1891	198,770	38.57	2,578.67
1892	198,755	39.12	2,581.85
1893	206,516	41.27	2,732.05
1894	218,513	40.89	2,827.28
1895	217,746	41.30	3,003.69
1896	214,414	42.37	3,127.73
1897	214,992	42.75	3,143.09

"Bericht des K. K. Eisenbahn-Ministeriums." Vienna, 1898.

The statistics heretofore given are sufficient to show the general trend of the traffic and the gradual increase that has taken place in several countries. The remainder of this chapter will be devoted to a brief summary of the development of the traffic in other countries. In Denmark the passenger traffic increased from 5.6 millions in 1878 (3.1 per capita), to 5.9 millions in 1880 (3.0 per capita), to 8.8 in 1888 (4.0 per capita), and to 13,321,000 in 1897 (1896–7, 6.1 per capita). The total passenger mileage was 387,436,220 kilometres in 1896–97. The passenger traffic of Bavaria increased, from 1885 to 1894, from 18,406,641 to 29,698,699 passengers, and from 650,365,459 to 1,000,532,753 passenger kilometres, while the accommodations offered increased from 2,883,012,943 to 4,546,442,615 place kilometres (number of seats by number of kilometres moved). From 1884 to 1889 the annual increase in the number of passengers carried on Bavarian railways was 3.39 per cent; from 1889 to 1894 it was 6.46 per cent, the total increase from 1884 to 1894 amounting to 61.58 per cent. From 1882 to 1890 the number of passengers carried by Roumanian railways increased from 1,163,507 to 2,906,862, an annual increase of 10.82 per cent. In consequence of a radical reduction of fares the traffic rose in 1891 to 4,332,813, an increase of 49 per cent in one year. This increase does not appear to have been due to improved economic conditions, as the freight traffic showed no corresponding increase.

Passenger Density on Prussian Railways.[1]

Year.	Passenger Density.	Year.	Passenger Density.
1856	155,647	1869	209,667
1857	164,188	1870	181,768
1858	157,994	1871	198,631
1859	153,064	1872	231,652
1860	153,637	1873	251,419
1861	160,950	1874	251,093
1862	168,242	1875	233,744
1863	181,804	1876	220,149
1864	187,040	1877	206,360
1865	203,373	1878	198,752
1866	182,355	1879	189,827
1867	202,056	1880	193,110
1868	198,878		

Average Passenger Density.

Period.	Passengers.	Per Cent.	Period.	Passengers.	Per Cent.
1856–60	155,075	100	1871–75	233,202	150
1861–65	181,132	117	1876–80	202,639	129
1866–70	195,240	126			

Prussian Passenger Receipts per Kilometre of Road.

Year.	Marks.	Year.	Marks.
1856	7,191	1869	7,848
1857	7,402	1870	6,704
1858	6,917	1871	7,521
1859	6,553	1872	8,502
1860	6,689	1873	8,934
1861	6,928	1874	9,030
1862	7,171	1875	8,579
1863	7,486	1876	8,065
1864	7,536	1877	7,540
1865	8,022	1878	7,291
1866	6,965	1879	6,820
1867	7,866	1880	6,857
1868	7,576		

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[1] Lohauss (Ludwig), "Der Personenverkehr auf den Preussischen Eisenbahnen in den Jahren, 1856–1880."

Period.	Passengers.	Per Cent.	Period.	Passengers.	Per Cent.
1856–60 . .	6,858	100	1871–75 . .	8,503	124
1861–65 . .	7,453	109	1876–80 . .	7,280	106
1866–70 . .	7,384	108			

Passenger Traffic of Danish State Railways.[1]

Year.	Number of Passengers (including season-ticket holders).	Number of Passengers. Kilometres.
1880–81	6,246,125	184,472,983
1881–82	6,742,906	201,359,750
1882–83	7,593,224	221,198,586
1883–84	7,993,282	230,948,383
1884–85	8,364,036	242,135,143
1885–86	8,045,179	233,956,672
1886–87	8,326,276	240,178,367
1887–88	8,342,307	243,154,110
1888–89	8,713,780	271,097,514
1889–90	8,970,301	260,181,604
1890–91	9,422,740	279,542,490
1891–92	9,648,113	281,497,353
1892–93	10,388,190	303,378,272
1893–94	11,384,208	329,932,541
1894–95	11,740,844	336,239,996
1895–96	12,840,950	367,094,556
1896–97	13,320,922	387,436,220
1897–98	14,589,434	456,098,215

Passenger Density on Austrian State Railways.[2]

Year.	Passenger Miles per Mile of Road.	Year.	Passenger Miles per Mile of Road.
1888	124,930	1893	206,516
1889	128,298	1894	218,513
1890	165,447	1895	217,746
1891	198,770	1896	214,414
1892	198,755	1897	214,992

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[1] Danske Statsbaner. "Beretning om driften, Aaret fra, 1ste April, 1897, til 31ste Marts, 1898." Kopenhagen, 1898. Tabelle II, page VIII.

[2] Pages 240, 241.

CHAPTER X.

THE PROFITABLENESS OF THE PASSENGER TRAFFIC.

The question is often asked, Is the passenger traffic profitable to the railways or is it operated at a loss? Both affirmative and negative replies have been given to this question, and a considerable amount of somewhat aimless discussion has been raised by the issue. In point of fact, however, the discussion has been indefinite, because the question itself is indefinite. In its present loose form the statement that the passenger traffic is unprofitable is easier to assert than to prove, and easier to deny than to disprove. What is meant by the passenger traffic being unprofitable? If it means that the railways would be in a better financial condition if they abstained entirely from carrying passengers, the conclusion is, in the great majority of cases, unwarranted. If, on the other hand, it means that the railways could not be made to pay if they carried only passengers, or that railways would not be constructed for the passenger traffic alone, or that they would then be unprofitable at least at the present rate of fares, the conclusion would be true for the greater number of existing steam railways.

The point of the whole difficulty is in the matter of joint costs. To be profitable, the operation of a railroad must have net receipts greater than the expenses which it involves. The receipts which are derived from the passenger traffic are kept separate and are easily calculable. The expenses of the passenger service, however, are inextricably interwoven with those of the freight service, and it is impossible to say in what manner a certain cost, let us say that of the administrative offices, should be prorated between the passenger and the freight departments. Such a problem is like the question, which of the two blades of the scissors does most of the cutting, when both blades are absolutely necessary to this operation. It is of course possible to establish rules and to divide the joint expenses in an arbitrary manner, such as, in proportion to the number of passenger and freight train miles or the number of passengers or tons carried, etc., but this is no real division of the expenses according to their source or cause. The cost of repairing the track is by no means in constant proportion to the number of trains that pass over it, and it is therefore purely arbitrary to distribute the expenses of track-men between passenger and freight expenses according to this or any other plan that may be devised.

All attempts to separate passenger from freight expenses have been declared incorrect. I hesitate to apply the word incorrect to them since that might imply that there was, or could be, some correct method which might subsequently be hit upon. The problem, however, is from its very nature unsolvable and must remain so, and such inquiries are therefore useless and necessarily barren in results.

The persistency with which many students of transportation essay the solution of the problem of the determination of the cost of passenger and freight service is to be attributed to the mistaken notion that railroad rates and fares are based or that, at all events, they should be based upon this cost. Decades of discussion have failed entirely to dissipate this mistaken notion, and the proposal is periodically championed to overthrow all the rate-making of the past, and to base all future rates and fares upon the cost of service. As before intimated, however, neither rates nor fares are ever, have ever been, or ever will or can be fixed with reference to this imaginary factor of cost, in the sense of a certain, definite, ascertainable proportion of the total cost of operation. Where, however, the question of the profitableness of a given traffic arises, where it is a question as to whether a certain extension of the business will or will not pay for itself, a factor is introduced which is usually confounded with that of average cost. This factor is that of marginal or additional cost. If, after the creation of the new traffic, the total receipts of the railroad exceed the total expenditures in a greater measure than before such new traffic was secured, then the traffic (factors other than cost being disregarded) is desirable. In other words, if the *additional* revenue traceable to the new traffic is greater than the *additional* expense incurred, directly or indirectly, in consequence solely of this traffic, then the new business is profitable. It may be at a rate which, if uniform, would ruin the railroad completely, but if it brings in more revenue than it causes new expenditure, it is profitable because the railroad is better off with it than without it.

The same argument applies to existing passenger traffic. The question is not whether or not the passenger receipts are greater than the passenger expenditures (which are indeterminate), but whether the receipts from this source are greater than the *additional* expenses, than the amount of money that would be saved by cutting off the passenger traffic. If this is the meaning of profitableness, namely, that traffic is profitable when it pays the road to keep it rather than lose it, it may be confidently asserted of the great majority of roads that their passenger traffic is profitable. In many instances, it is true, passengers must be carried owing to the nature of the charters, while in other cases the passenger traffic is in itself unprofitable, but is maintained in order to develop the country and stimulate the freight traffic. In the majority of instances, however, the railways would dwarf this traffic if it paid the road better to leave it than to take it.

There are several points of evidence bearing upon the question. Of these the points of chief interest are the declining proportion of passenger as compared with freight receipts, the decline in the passenger receipts per mile and, finally, the reduced income per passenger train mile.

In estimating the comparative profitableness of any traffic, the best unit of comparison is the passenger train mile. An increase in the number of passengers traveling by a given train, or an increase in the distance that they cover, may be unaccompanied by any increase in the cost to the railway, but every increase in the mileage of trains run brings with it invariably a considerable immediate increase in expenditure. There are certain train expenses which are fairly constant, and although these expenses form but a fraction of the whole outlay upon the railway, they constitute a definite cost, and each new train, or even each additional mile run by a train, signifies the addition of a certain appreciable expense to the operating company.

The statistics of the railroads of the United Kingdom show that during the last forty years the passenger receipts per mile, run by passenger trains, have decreased with considerable regularity, this being true not only for English but for Scotch and Irish railroads. The receipts for English trains have decreased almost a fifth, though during the last ten years they have maintained themselves and even increased.

RECEIPTS IN CENTS PER PASSENGER TRAIN MILE ON BRITISH AND IRISH RAILWAYS.

Year.	England and Wales. Cents.	Scotland. Cents.	Ireland. Cents.	United Kingdom. Cents.
1858	121.4	115.7	115.5	
1870	121.0	91.2	99.1	108.0
1876	119.7	109.6	113.8	118.4
1881	105.9	96.2	92.3	104.2
1886	99.7	86.7	84.6	97.6
1891	100.8	81.4	91.4	98.2
1896	100.8	81.5	87.4	97.8

GENERAL AVERAGE FOR THE TWENTY YEARS 1877–96.

	Cents.	Cents.	Cents.	Cents.
1877–86	107.8	94.8	95.8	105.1
1887–96	99.8	82.9	89.2	98.8
Percentage of decline	7.4	12.5	6.9	6.0

The receipts per passenger mile, however, are by no means uniform for all British roads, varying (as may be seen from the accompanying table) from (in 1896) 78.8 cents on the Midland Great Western of Ireland, to 144.2 cents on the Taff Vale Railway. (See page 138.)

It seems almost impossible, however, to ascribe either high or low receipts per passenger train mile to general causes, or to identify this phenomenon with the general profitableness of passenger management. We have seen that the receipts are much higher in England than in Ireland, but one cannot without further evidence ascribe this to the greater density of the traffic, since the receipts per passenger train mile in Ireland are considerably greater than those on Scotch roads. It might also appear at first sight that the railways which were preponderatingly devoted to the passenger traffic would obtain on an average the greatest revenue per train, and we find that in each of the great passenger railways of the United Kingdom the receipts per passenger train mile are considerably greater than the average for the Kingdom. (See the Southeastern; London, Brighton & South Coast, and the London & Southwestern.) It is equally, true, however, that the railway with the smallest percentage of passenger traffic (the Taff Vale) is also the road with the greatest receipts per passenger train mile, and there are several other exceptions which disprove the rule. An inseparable connection between large receipts per passenger train mile and large receipts

RECEIPTS PER PASSENGER TRAIN MILE ON BRITISH AND IRISH RAILWAYS, 1887–96.

Year.	(1) Caledonian.	(2) Furness.	(3) Glasgow & South-western.	(4) Great Eastern.	(5) Great Northern.	(6) Great Northern of Ireland.	(7) Great Northern of Scotland.	(8) Great Western.	(9) Great Southern & Western of Ireland.	(10) Lancashire & Yorkshire.
	d.	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*
1887	41.67	34.76	44.90	47.99	38.78	42.87	38.17	56.18	49.44	43.68
1888	43.25	36.44	44.37	47.24	39.23	43.87	35.87	55.19	48.08	43.31
1889	42.69	37.97	42.66	48.35	39.93	44.87	36.94	55.71	49.12	42.31
1890	42.52	38.23	43.25	49.08	40.74	45.77	38.13	55.58	49.46	42.61
1891	40.48	37.72	42.76	49.20	40.77	46.31	38.90	54.25	49.12	43.67
1892	40.97	36.76	42.01	48.32	40.93	46.29	39.69	53.71	48.28	44.39
1893	41.11	36.59	39.78	48.38	41.91	45.78	40.10	52.32	46.54	44.84
1894	41.23	38.07	41.06	47 79	41.19	46.54	39.28	51.51	46.52	45.77
1895	40.65	38.21	40.94	48.33	41.42	46.78	37.28	51.06	47.24	45.75
1896	39.74	39.17	39.81	49.82	42.15	46.88	35.31	50.47	46.43	46.07
In cents, 1896	80.3	79.1	80.4	100.6	85.1	94.7	71.3	101.9	93.8	93.1

Year.	(11) London & North-western.	(12) London & South-western.	(13) London, Brighton & South Coast.	(14) Manchester, Sheffield & Lincolnshire.	(15) Midland.	(16) Midland Great Western of Ireland.	(17) North British.	(18) Northeastern.	(19) Southeastern.	(20) Taff Vale.
	d.	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*
1887	51.37	56.92	56.30	45.58	40.58	38.87	40.12	43.03	64.21	70.73
1888	51.40	55.47	55.01	45.05	39.53	40.60	40.26	42.53	63.89	68.42
1889	52.08	56.42	56.17	46.28	39.21	40.75	41.35	44.91	64.05	73.93
1890	52.40	56.83	57.52	47.88	41.35	42.50	40.57	46.39	63.75	81.21
1891	52.46	57.17	57.66	48.46	40.92	43.21	39.00	44.99	62.75	85.63
1892	51.69	57.49	57.86	47.14	40.63	43.07	39.34	44.00	60.43	82.71
1893	52.64	57.47	58.17	44.95	41.70	42.69	39.57	42.83	60.50	74.27
1894	54.08	56.22	57.57	44.92	42.30	41.99	40.23	43.31	61.57	76.11
1895	54.41	55.44	58.60	45.20	42.87	41.13	40.29	42.92	61.28	73.79
1896	54.62	54.49	58.79	46.21	43.72	39.04	40.52	43.28	63.31	71.35
In cents, 1896	110.3	110.1	118.8	93.3	88.3	78.8	81.8	87.4	127.9	144.2

per freight train mile appears to be equally lacking. Of the twenty railways, seven (Nos. 4, 8, 11, 12, 13, 19 and 20) have passenger train receipts above the average, while ten of the twenty have freight train receipts above the average, and as only four railways have both freight and passenger receipts above the average for the Kingdom, there appears to be no reason to assume any necessary connection between large receipts per passenger train and large receipts per freight train.[1]

Neither do these statistics furnish ground for a belief that the receipts will be large in proportion to the expenses in cases where both the receipts per passenger train mile and those per freight train mile are great. On the four railways (11, 13, 19, 20), in which both passenger and freight receipts per train mile are above the average for the Kingdom, the receipts actually bear a smaller proportion, amounting on an average to only 179 per cent of the expenditures for these four roads as compared with 183 per cent for the whole twenty roads.[2]

In the United States the receipts per passenger train mile have decreased even more rapidly.[3]

During the last twenty-five years the average receipts per passenger train mile decreased from 123.5 to 84.9 cents, a

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[1] On the simple calculation of probabilities there should be 3½ railways having both passenger and freight receipts above the average.

$$\frac{7}{20} \times 10 = 3\tfrac{1}{2} \text{ or } \frac{10}{20} \times 7 = 3\tfrac{1}{2}$$

[2] In this and similar cases I have taken the average of the percentages for the different roads, instead of taking the percentage for all the roads combined. Thus, if the coefficient of exploitation (that is, the ratio of expenditures to receipts) is in several cases 50, 52, 54, 56, 58 per cent, the average ratio for these five roads would, according to my calculations, be 54 per cent—

$$\frac{(50 + 52 + 54 + 56 + 58)}{5}$$

although the true ratio for the five roads combined might be somewhat different.

[3] "Bulletin No. 15, U. S. Department of Agriculture, Division of Statistics."

	Year.	Cents.	Year.	Cents.	Year.	Cents.
	1867 . .	116.3	1877 . .	104.7	1887 . .	98.1
	1868 . .	128.9	1878 . .	103.4	1888 . .	92.3
	1869 . .	125.1	1879 . .	102.7	1889 . .	90.2
	1870 . .	117.8	1880 . .	111.0	1890 . .	91.5
	1871 . .	129.5	1881 . .	113.8	1891 . .	90.2
Arithmetical mean	1867–71	123.5	1877–81	107.1	1887–91	94.5
	1872 . .	119.1	1882 . .	113.9	1892 . .	89.8
	1873 . .	115.8	1883 . .	109.5	1893 . .	89.4
	1874 . .	114.4	1884 . .	103.2	1894 . .	87.0
	1875 . .	108.4	1885 . .	91.2	1895 . .	78.7
	1876 . .	105.5	1886 . .	88.7	1896 . .	79.5
Arithmetical mean	1872–76	112.6	1882–86	101.3	1892–96	84.9

decline of 31.2 per cent, while during the same period, 1867–71 to 1892–96, the average receipts per freight train mile increased from 150.1 to 160.8 cents, an increase of 7. 1 per cent.

Notwithstanding the diminished rate at which the number of trips on British railways increased, and despite the reduction of the average distance traveled and the decrease in the fares per mile, the total receipts from the passenger traffic have kept pace with the increasing mileage, and the receipts per mile of line open have steadily increased. This is due in large measure to the comparative age of existing British railways. By the year 1850 the United Kingdom had already constructed 32 per cent of its present (1894) railway mileage, while Germany had but 13 per cent, Austria-Hungary 7 per cent, the United States of America 5 per cent, and Russia but 2 per cent of their present mileage. While the mileage of Russian railways increased fiftyfold, that of the United Kingdom simply trebled, and the traffic of the existing railways increased sufficiently to more than counterbalance the effect of the lighter traffic on the newer roads. The following table shows the passenger receipts per mile of railroad in the United Kingdom in the years 1858 and 1870, and during each of the twenty-five years, from 1872 to 1896:

PASSENGER RECEIPTS IN POUND STERLING PER OPEN MILE OF RAILWAY.

Year.	England and Wales.	Scotland.	Ireland.	United Kingdom.
1858	1,468	806	706	1,253
1870	1,479	707	602	1,235
1872	1,695	807	632	1,409
1873	1,775	865	669	1,483
1874	1,818	870	665	1,513
1875	1,851	904	665	1,543
1876	1,849	938	669	1,551
1877	1,859	938	655	1,554
1878	1,863	927	648	1,551
1879	1,759	867	595	1,464
1880	1,828	900	608	1,517
1881	1,841	919	584	1,524
1882	1,879	946	603	1,560
1883	1,900	973	607	1,580
1884	1,918	978	600	1,592
1885	1,865	966	586	1,553
1886	1,884	990	563	1,565
1887	1,886	971	563	1,562
1888	1,879	1,021	566	1,564
1889	1,979	1,040	577	1.636
1890	2,069	1,097	591	1,710
1891	2,113	1,112	592	1,740
1892	2,132	1,128	591	1,755
1893	2,113	1,122	581	1,736
1894	2,134	1,112	581	1,745
1895	2,163	1,144	580	1,764
1896	2,260	1,184	585	1,839

Summarizing this table (and reducing to American coinage at the rate of $4.85 per pound sterling), we obtain the following results for the United Kingdom:

RECEIPTS IN DOLLARS PER OPEN MILE OF RAILWAY.

Year.	Dollars.	In Per Cent of 1858.	Year.	Dollars.	In Per Cent of 1858.
1858 . .	6,077	100	1886 . .	7,590	125
1870 . .	5,990	99	1891 . .	8,439	139
1876 . .	7,522	124	1896 . .	8,919	147
1881 . .	7,391	122			

In other words, despite the fact that the receipts per passenger train mile have decreased almost a fifth, the number of trains has increased to such an extent as to give for each mile of road, in 1896, a passenger revenue 47 per cent greater than was the case in 1858, and 48 per cent greater than for the year 1870.

A further analysis of this table will develop interesting facts. The receipts from passenger traffic are almost twice as great in England (and Wales) as in Scotland, and more than twice as great in Scotland as in Ireland, the receipts per mile being $10,961 in England, $5,742 in Scotland and only $2,837 in Ireland. It is also worthy of note that while the passenger receipts per mile have been gradually increasing in England and Scotland since 1858, and more particularly since 1870, the corresponding returns show a decrease in receipts for the Irish railways. The passenger receipts per mile of line open were, in 1896, 74 per cent greater in England, 47 per cent greater in Scotland, but 17 per cent less in Ireland than in 1858. It is an interesting commentary on the general industrial and more particularly the railway development of Ireland, that while in 1858 the amount of revenue derived from passengers was 88 per cent as great per mile of road as in Scotland, in 1896 this revenue had sunk to less than 50 per cent of that of Scotland.

In the United States, on the contrary, the receipts from passenger traffic per mile of road have greatly diminished. This has not been due to the slight reduction in fares, since, in the freight traffic, where the reduction has been far greater, the receipts per mile of road have not fallen off correspondingly. The decline is rather to be attributed to the construction of newer and less profitable railways in more thinly settled districts, which construction has been more rapid than the growth of the passenger traffic. The railways of the unsettled districts of the West cannot obtain the traffic which is to be found on the older roads of the East, and the creation of the new roads has more than counterbalanced the increase of the traffic upon the older ones. The following table shows the decrease in the passenger receipts per mile of railroad in the United States.

Year.	Passenger Receipts per Mile.	Year.	Passenger Receipts per Mile.
1867	$2,516	1882	$1,925
1868	2,186	1883	1,885
1869	2,126	1884	1,872
1870	2,416	1885	1,694
1871	2,360	1886	1,691
1872	2,284	1887	1,810
1873	1,983	1888	1,757
1874	2,051	1889	1,656
1875	1,822	1890	1,667
1876	1,788	1891	1,743
1877	1,650	1892	1,766
1878	1,665	1893	1,776
1879	1,699	1894	1,624
1880	1,839	1895	1,419
1881	1,884	1896	1,465

The average receipts declined therefore from an average of $2,321 during the period 1867–71, to one of $1,610 in the period 1892–96, a decline of 30.8 per cent.

On German railways, on the contrary, where during the last twenty years the construction of new railways has been less rapid than in the United States, but more rapid than in the United Kingdom, the passenger receipts per mile have remained fairly constant despite a decrease of about 20 per cent in the fares. The average passenger receipts on German railways amounted to $3,363 per mile during the years 1874 to 1878–9, while during the period 1889–90 to 1893–4 the average passenger receipts were $3,518, an increase of only 4 per cent during this period.

The passenger receipts on Prussian railways have increased about fortyfold during the last fifty years, but the increase in the freight receipts has been so much greater that the passenger earnings are comparatively far less important than in former years. In 1844, 64.9 per cent, or almost two-thirds of all receipts, were obtained from the passenger traffic; in 1846 this had declined to 57.7 per cent; by 1851 to 46.2 per cent; by 1861 to 31.7 per cent; by 1871 to 28.5, and by 1880–1 to 24.9. During the decade that followed there was a considerable increase in the passenger traffic, and the receipts from this source by 1890–1 amounted to 26.0 per cent of the total receipts.[1]

For the whole of Germany the passenger and freight receipts have increased at about the same rate during the last twenty years, as may be seen from the following table:[2]

Year.	Percentage of Passenger.	Total Receipts, Freight, per cent.	Year.	Percentage of Passenger.	Total Receipts, Freight, per cent.
1874 . .	28.9	71.1	1884–85 .	28.2	71.8
1875 . .	28.6	71.4	1885–86 .	29.0	71.0
1876 . .	28.5	71.5	1886–87 .	29.1	70.9
1877–78 .	28.4	71.6	1887–88 .	28.1	71.9
1878–79 .	28.8	71.2	1888–89 .	27.7	72.3
1879–80 .	27.8	72.2	1889–90 .	27.7	72.3
1880–81 .	28.5	71.5	1890–91 .	28.8	71.2
1881–82 .	28.6	71.4	1891–92 .	28.8	71.2
1882–83 .	28.0	72.0	1892–93 .	28.6	71.4
1883–84 .	27.8	72.2	1893–94 .	28.7	71.3

Extreme variation during whole period 1.4 per cent.

While it is impossible, as may be seen from the foregoing, to make a general statement as to whether the passenger traffic is profitable or not, and while even this question itself in this general form is without definite meaning, it is plain to be seen that there are certain developments in the passenger service, some of which are connected with an improved service, which tend toward a decline in the remuneration per unit of service as well as towards a smaller revenue from the passenger as compared with the freight traffic. In the following chapter certain elements affecting the cost of operation are considered.

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[1] "Stat. Handbuch für den Preuss. Staat."

[2] "Statistisches Jahrbuch für das Deustche Reich, 1895."

CHAPTER XI.

ELEMENTS IN THE COST OF OPERATION OF PASSENGER TRAFFIC.

There are few things better known in railroad practice than the impossibility of accurately distributing the total costs of railroad operation between the passenger and the freight traffic. Besides the costs which are fixed and independent of all traffic, there are a number of elements in the cost of operation which are "joint costs," and which cannot be ascribed to any single portion of the traffic.

It is possible, however, to calculate, with a considerable approach to accuracy, the effect which an increase of any given form of traffic will exercise upon the total cost of conducting the railroad, and it is equally feasible to show just what elements in the cost will be affected by such an increase in the traffic. It is impossible to say what part of the expenses of a railroad is to be attributed to the passenger traffic; it is not impossible, however, to foretell about what increase in the operating expenses will be caused by an increase in the volume of any given traffic. It is this relation between the additional income and the additional expense from the new traffic, however, which really determines whether such an increase is advisable or not.

In estimating the additional cost made necessary by an increase in the passenger traffic of a railroad, the number of cars required may be said to enter to no considerable extent into the calculation.

The number of passenger coaches owned by a railway company counts for but little in estimating the operating expenses. Upon the whole, there seems to be no tendency for the passenger rolling stock to increase as rapidly as the traffic, but the tendency seems rather to be in the opposite direction. In 1844 there were on all Prussian railways 8.7 passenger cars per every 1,000,000 passenger miles of traffic; by 1846 the number of cars had diminished to 6.1, by 1851 to 4.7, by 1856 to 4.4, by 1861 to 3.7, by 1866 to 2.7 passenger cars per million passenger miles. By 1871 the number of passenger cars per million passenger miles had risen to 2.9, and from 1871 to 1876 there was a rapid increase in the rolling stock, in the latter year the proportion of passenger cars to passenger miles being 4.4 to a million. In 1880–81 there were also 4.4 cars, in 1885–86 4.2, and 1890–91 3.2 cars per million passengers carried one mile. The number of cars per million passengers has also decreased on the Belgian state railways,[1] where the absolute figures are so small, however, that a relative increase or decrease is of little importance. An increase of 25 per cent in the Prussian passenger rolling stock would have meant in 1890–91 an increase of almost four thou-

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[1] Period.	Number per 100,000 Passengers.	Period.	Number per 100,000 Passengers.
1835–40	18.73	1861–70	14.19
1841–50	22.61	1871–80	8.78
1851–60	19.16	1881–83	8 50

In 1882 the average number of seats in passenger cars per 1,000 passengers was as follows ("Jean's Railway Problems," p. 257):

Number of Places.	Average Number of Places per Each 1,000 Passengers.	Number of Places.	Average Number of Places per Each 1,000 Passengers.
Germany	3.86	Holland	3.55
Austria	5.96	Roumania	8.83
Belgium	2.56	Russia	6.99
Denmark	3.40	Finland	4.36
France	3.59	Switzerland	3.36
Italy	5.36		
Luxemberg	3.30		Ave. 4.06
Norway	5.07		

sand cars, but would have meant only $\frac{8}{10}$ of a car per 1,000,000 passenger miles, or per $120,000 of receipts. Even so large an increase in the number of cars as has thus been contemplated, however, would signify merely that every $150,000 of receipts ($\frac{\$120000}{0 \cdot 8}$) would have to be offset by the additional cost involved in keeping in repair and paying interest on the cost of one passenger car, a charge which could certainly not be placed higher than 1 per cent of this sum.

It is not in the purchase of cars, but in their use, that the real expense lies. This use consists of two elements, the number of cars to a train and the number of passengers to a car. It cannot be supposed that any engine, however great its power, can haul an indefinite number of cars. There is an absolute limit to the hauling power of a locomotive, but a more effective limit is placed by the requirements of speed. At a given rate of speed, and upon a road with a definite ruling gradient, a locomotive cannot haul more than a given number of cars, and even before this point is reached an increase in the number of cars is accompanied by a corresponding increase in the cost of the motive power.

The limit which is laid by speed upon the number of cars is still further reduced by the demands for comfort on the part of the passengers. The demand for room is a variable factor in different countries, and it may be stated, as a rule, that the people who demand speed are not necessarily those who require comfort. Where the one consideration must be sacrificed to the other the decision is made in favor of one alternative in some countries and of the other alternative in other countries. We may select an illustrative case from a parallel field of observation. The Parisian or Berliner could not for a moment conceive the possibility of his being willingly subjected to the overcrowding of an American street car. But even Kipling's New York millionaire, "hanging on to a leather strap between an Irish washerwoman and a German anarchist," prefers this overcrowding in the cars to the waiting at street corners for a 'bus which has not yet obtained its complement of passengers.

The American public does not tolerate in the steam cars the overcrowding that is to be observed in street cars, and this is also true of European travelers, who demand a seat where they pay their fare. Not only does the passenger demand a seat, but frequently offers a passive resistance to the admission of new passengers to a carriage which is not yet full. There is a number of inveterate habits of travelers which, while their effects may not be statistically measured, are not yet without their influence upon the operating expenses of a railway. The habit on European railways, especially in third- and fourth-class compartments, of trying to prevent others, either by obstructing the view or otherwise, from entering the car, is as easily observable as the tendency of people in a crowded street car to group themselves in the rear of the car. In our own trains, and in the higher class European compartments, a passenger feels himself aggrieved if he has to share a double seat. The complaisant agents of a railway company are apt to make concessions to this feeling, and the demand for comfort and the distaste of personal contact with other passengers thus result in a poorer use of the seats available.

Another and a more important factor, however, is that arising from the inequalities and fluctuations in the bulk of the traffic. The total passenger traffic of railroads in opposite directions balances itself in the course of a short period, but the traffic is in one direction in one part of the day or month and in the opposite in another. The traffic on our street railways, with the regular succession of periods of no travel and of excessive travel, of overcrowded cars in one and empty cars in the opposite direction, repeats itself in the case of the steam railroads. A series of experiments on the Prussian state railways during the period from June 1 to September 30, 1890,[1] showed the greatest divergencies in the use of the cars in the same railway division (Eisenbahn-Bezirk), while even during heaviest traffic on holidays the utilization of the cars did not seem to improve.

The chief cause of a poor utilization of passenger car capacity is to be found in the character of the service. If good service is to be obtained it must be paid for, not necessarily by the traveler, but, at all events, by somebody. It does not follow that the good service is not worth the difference in cost, the other conclusion may be the truer. I should not like to advocate the general adoption of a fourth-class (Prussian) service for the American public, even if we could get it more cheaply. The correspondence which I wish to point out here, however, is that the poorer the service generally the better is apt to be the utilization of the cars. Speed does not prevent a filling of the cars, although it puts a limit to the number of cars hauled. The more room given per passenger, however, the larger the proportion of passengers seated to those left standing, the greater the accommodations for lavatories, etc., and the more generous the provisions for vestibules and exits, the more apt is the use of the car capacity to be decreased. The more frequent the scheduled trains, the worse the economy of car capacity. When all the passengers who wish to leave a certain place between 5 a. m. and noon are forced to leave by the noon train, there is a good chance of the train being well filled. If, besides the noon train, there is another, say at nine o'clock, many who could not have waited until noon will ride, and new traffic will be created, but the probabilities are that neither train will be as well filled as the single train would have been; and if this is not true of the second train it will be of the third, fourth or still later train. It may be to the interest of the railway to give the public a quite inadequate service in order to use the rolling stock better

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[1] See "Personentarifreform und Zonentarif." Berlin, 1892. Pp. 44–47.

(and this tendency is frequently observable in the street railway service), or this may be done to the detriment of the railroad. But the correspondence between an effective use of the car capacity and a poor service can easily be demonstrated.

UTILIZATION OF SPACE.

Considered as a whole, European railroads transport three empty seats for every one that is occupied. The percentage of seats occupied to seats offered is as follows:

Country.	Year.	Percentage of Occupied Seats to Total Number of Seats
Finland	1895	19.65
Sweden (state)	1895	20.59
Norway	1895–96	21.20
Saxony (state)	1895	21.36
Denmark (state)	1896–97	23.5
Germany	1894–95	24.34
Belgium (state)	1895	24.55
Austria	1895	25.68
Prussia	1895–96	26.96
Switzerland	1894	27.71
Russia	1894	35.51

A brief study of these statistics shows that in every country, except Russia, there are three to four unoccupied per one occupied seat, and we may probably look upon this proportion as the usual one upon European roads. The results obtained are, of course, not universal, as the percentage of occupied seats is not given in all countries, nor for all railroads, and in some cases can be arrived at only approximately. Moreover, the results vary greatly within the various countries themselves. Thus, in Holland the average ratio of utilization is about 24 per cent, but it varies from 13.62 per cent in the North Brabant German Railway, to 36.90 per cent for the Central Railway of Holland. In Austria the proportion of occupied seats varies from 10 per cent to 40 per cent of the whole, and, in the case of the Anspitzer Localbahn, a five-mile local road with an undeveloped traffic, the proportion of seats occupied is 62.91 per cent. In Switzerland there are even wider variations between the maximum and minimum ratios of utilization, and in Prussia the greatest differences are noticed within the several railway districts themselves.[1] In all these countries, however, an average of from 20 to 25 per cent is maintained for the large lines.[2]

Unfavorable as is this proportion, it is probable that on American railways the proportion of unoccupied seats is still more unfavorable. In 1896 the number of passengers per train was, according to Poor, but 35.67, which is a utilization considerably less than 25 per cent of the total seating capacity of the average train.

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[1] In his excellent monograph, "Personentarifreform und Zonentarif," Berlin, 1892, Ulrich has quoted the maximum and minimum average ratios of exploitation of all trains upon the Prussian state railways during the period of June 1 to September 30, 1890, obtained from the official statistics. According to these figures, the percentage of exploitation varies for different trains and for different parts of the line within the same district (Eisenbahn-Directionsbezirk) from 91.8 to 23.3 per cent; from 88.8 to 6.2 per cent; from 73.2 to 2.9 per cent; from 70.0 to 10.3 per cent, for express trains; from 88.3 to 0.9 per cent; from 81.7 to 3.5 per cent; from 74.5 to 0.8 per cent; from 79.9 to 3.3 per cent; from 71.5 to 1 per cent, for accommodation trains, and from 91.0 to 4.3 per cent; from 74.5 to 1.3 per cent, and from 76.7 to 3.1 per cent for mixed trains. Of course, much of this traffic with the minimum utilization of seating capacity is decidedly unprofitable, and would be discontinued if financial considerations alone prevailed, but in the interest of the general public, and in that of the postal service, many unprofitable trains are maintained.

[2] An apparent exception of considerable importance is observed in Roumania. According to the "Album de statistique graphique du service du mouvement des chemins de fer roumains pour l'année, 1894," the utilization of the passenger cars during the month of July (a period of heavy traffic) was 62.6 per cent in 1894, 65.8 per cent in 1893, and actually 69.0 per cent in 1892. These phenominally high figures might perhaps permit a shade of doubt as to their accuracy, although an independent authority (*Archiv für Eisenbahnwesen*) asserts that the Roumanian cars are exceptionally well filled, averaging 50 per cent on *many* parts of the line, and exceeding that proportion for third-class traffic on almost every part of the line.

The causes of this poor utilization of the cars are not far to seek. Many of them are inherent in the character of the traffic. Even if every seat were always occupied, the proportion of dead weight to paying weight would be far greater than in the freight traffic. Passengers cannot be treated like freight. They cannot be piled up, one upon the other like bales of cotton or bundles of hay; they demand a certain amount of air and a minimum of standing, if not of seating room, and even in the fourth-class compartments of Continental railroads some pretense is made of ministering to the traveler's comfort. Moreover, passengers cannot be detained for hours and days until a sufficient number are collected at the stations, although the high degree of utilization in the fourth-class is probably traceable, at least in part, to the infrequency of the service. As a rule, trains must run on schedule time, be they full or empty, and no amount of ingenuity can predetermine exactly the demands to be made in a given place and at a given time upon the rolling stock of the company.[1] The traffic, moreover, does not nicely balance itself like the two sides of an account. In freight transportation the bulk of the traffic is in one direction (usually from the agricultural and mining to the industrial districts), and return trains must necessarily run with diminished loads. In the transportation of passengers there is, it is true, no such permanent trend of traffic, since, in the great majority of cases, whoever goes out is sure to return. But he is not sure to return by the next train. In the suburban traffic the outgoing trains run empty in the early morning, as do the incoming trains in the late afternoon, and a similar, though less strongly marked, tendency is observable in other branches of the passenger traffic. Even in the short excursion traffic it is often impossible to obtain a favorable utilization of the seating capacity of cars. An interesting example of this fact was furnished by Herr von Scala, in a debate held in Vienna, on the feasibility of adopting a zone tariff with radically reduced rates,[1] On the short line from Vienna to Rekawinkel there was, during the week days of the summer of 1884, an average of 10,200 passengers traveling 96,600 kilometres (about 60,000 miles), and the proportion of seats occupied was 20.4. On Whit Monday (a day for excursionists) the traffic increased over sixfold, but, despite this immense addition to the normal traffic, the ratio of utilization was only 27.4 per cent.

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[1] The amount of the traffic will depend upon a large number of circumstances, many of which cannot often be predicted. A rainy Sunday in summer may deter thousands from their expected excursion travel, and the cars will run empty, and the percentage of occupied seats will be diminished.

The utilization of the cars is also injuriously affected by the great variations in the intensity of traffic. In the immediate neighborhood of a large city the traffic is very dense and the utilization of the cars high, but with increasing distance the use of the seating capacity of the carriages becomes less and less. In moving away from a large city accommodation trains gradually empty themselves. New passengers enter the cars, but in insufficient number to offset the departure of others, since it may be said, in a loose and general way, that a city attracts travelers from its neighborhood directly in proportion to its size, and inversely in proportion to the intervening distance. It is not until a new city is approached that the cars are refilled. For this reason it is usually inexpedient to run too many accommodation trains for long distances (as is often done on the Continent), and advisable to separate, as far as feasible, the slow local from the through express traffic.

The low rate of utilization of the seating capacity of passenger coaches is not seldom attributed, in the case of European railroads, to the large number of classes. It is claimed that the division of the cars into first, second, third and fourth classes, into compartments for women, for smokers, for nonsmokers, etc., makes a complete utilization extremely difficult, since, if one compartment, or set of compartments, is full at train time, it will be by the merest chance that the other compartments are similarly filled. This is undoubtedly true, but the incomplete utilization is quite as frequently attributed to poor judgment exercised in the composition of the train, or to the difficulties inherent in a full use of the seats in the higher classes. The running of first- and second-class carriages on slow trains in rural districts is an instance of such erroneous judgment which is not infrequently noted on Continental railroads, and the inferior exploitation of first- and second-class carriages may now be regarded as a universal phenomenon.

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[1] "Hertzka Der Personenporto," S. 54.

The comparative statistics of utilization of passenger cars do not seem to support the theory that the more intense the traffic the better the utilization of the cars. It is true that the returns for Finland, Norway and Sweden are low, but those for Russia and Roumania (despite their sparse traffic) are more than correspondingly large. The official reports for Saxony attribute the decline in the ratio of utilization on its railways to a corresponding decline in the average length of journey, but comparative statistics do not point to a necessary connection between short trips and low ratio of exploitation. The utilization of passenger cars is greater in Belgium, Prussia and Switzerland (although the average trip is shorter) than in Sweden, Norway and Finland, and American experience likewise furnishes a striking contradiction of this theory.[1] It is equally

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[1] There are no statistics of the ratio of utilization for the whole of the United States, but the general tendency may be shown by comparing the average length of the trip with the average number of persons per train. The following figures have been calculated from Poor, for the years 1894, 1895 and 1896.

From this it may be seen that far from there being an inseparable connection between long journeys and well-filled cars, there is rather a tendency in the United States for cars to be well filled where there is short distance travel. Thus difficult to determine, from the statistics, whether upon the whole the ratio of exploitation is improving or deteriorating, although the balance of evidence points somewhat to the latter conclusion. In Switzerland the percentage of seats occupied was 30.93 per cent in 1882, 29.70 per cent for the years 1886 and 1887, and but 27.77 per cent in 1893 and 1894. In Finland there has been a decline from 23.43 per cent in 1891 to 19.65 per cent in 1895.[1] In Saxony there

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Group I, VIII, II and III, which range first, second, third and fourth in the number of passengers per train rank first, third, second and fourth in the shortness of the average journey, while the groups in which long journeys prevail are precisely those in which there are few passengers per train. It would be unsafe to generalize from this, however, especially as in the above-mentioned groups short trips correspond with dense traffic.

Groups.	Location.	Number of Passengers per Train, 1894-96.	Average Length of Trip, 1894-96. Miles.
Group I . . .	New England States .	60.76	15.65
“ II . . .	Middle “ .	43.28	18.20
“ III . . .	North Central “ .	36.05	29.81
“ IV . . .	South Atlantic “ .	29.53	36.70
“ V . . .	Gulf and Miss. “ .	31.42	38.43
“ VI . .	Southwestern “ .	31.28	49.05
“ VII . . .	Northwestern “ .	32.86	59.22
“ VIII . . .	Pacific “ .	57.48	28.87
Total U. S. . .	. . . .	38.68	24.02

[1] PERCENTAGE OF SEATS OCCUPIED ON FINNISH RAILWAYS.

Year.	Per Cent.	Year.	Per Cent.
1891	23.43	1894	19.57
1892	20.91	1895	19.65
1893	20.44		

has also been a decline during the last decade.[1] In Prussia the utilization declined rapidly from 1883 to 1886, but it has since recovered, owing largely to the better utilization of the fourth-class cars. In Denmark the proportion has become slightly more favorable, increasing from 22.4 per cent in 1894–95, and 22.9 in 1895–96, to 23.5 per cent in 1896–97; but the percentage is less than in the year 1893–94 (23.7 per cent), and considerably less than for 1882 (25.76 per cent). In Norway the percentage has fluctuated greatly during the last five years,[2] although the average for the last five years (20.5 per cent) compares unfavorably with that for 1882 (24.1 per cent). In Belgium the utilization appears to be growing better, averaging 21.73 per cent for the years 1886 and 1887, and 24.78 per cent for the years 1894 and 1895. The following figures show how constant, upon the whole, has been the use of the Belgian cars:

[1] PERCENTAGE OF SEATS OCCUPIED ON SAXON RAILWAYS.

Year.	Per Cent.	Year.	Per Cent.	Year.	Per Cent.
1880	23.38	1886 . . .	23.17	1892 . . .	21.57
1881	23.11	1887 . . .	23.84	1893 . . .	21.73
1882	23.54	1888 . . .	23.84	1894 . . .	21.92
1883	23.82	1889 . . .	23.28	1895 . . .	21.36
1884	23.60	1890 . . .	23.41	1896 . . .	21.64
1885	23.37	1891 . . .	22.56		

It must be observed, however, that the ratio of exploitation remained firmly constant until 1890. From 1880 to 1884 the average ratio was 23.49 per cent; from 1885 to 1890 it was the same; from 1891 to 1896 it was 21.80.

[2] UTILIZATION OF PASSENGER CARS ON NORWEGIAN RAILWAYS.

Year.	Per Cent.	Year.	Per Cent.
1891–92	19.9	1894–95	19.6
1892–93	20.9	1895–96	21.2
1893–94	21.0		

Year.	Per Cent of Utilization.	Year.	Per Cent of Utilization.	Year.	Per Cent of Utilization.
1872 . .	23.27	1876 . .	23.36	1880 . .	22.50
1873 . .	22.84	1877 . .	22.64	1881 . .	23.22
1874 .	22.96	1878 . .	. .	1882 . .	21.05
1875 . .	23.68	1879 . .	22.70	1883 . .	21.16
				1884 . .	23.49

The Bavarian statistics from 1884 to 1893 also show great stability, with a tendency to decline, the average for the years 1884–88 being 23.10 per cent, and for the years 1889–93 only 22.63 per cent.

In considering the American statistics, we must take as our unit of comparison not the proportion of seats occupied, but the number of persons to a train. It costs considerably less to transport one train of eight cars than two trains of four cars each, and the best unit of cost is, therefore, the passenger train mile. The percentage of seats filled may increase, while the total number carried, which is the real utilization of the train, is decreasing, since the trains may be shortened. This is what has actually occurred in Belgium, the number of carriages per passenger train decreasing 16 per cent (from 8.86 to 7.45) during the period from 1886 to 1896, while the number of cars per freight train increased 8 per cent (from 16.94 to 1836) during the same period.[1]

Taking the number of passengers per train, that is, the number of passenger miles divided by the number of passenger train miles, as a basis of comparison, it is seen that the average train carries considerably fewer passengers to-day than it did thirty years ago. While in 1867 each train carried, on an average, 65 persons, the number of persons so carried amounted to only 39 in 1896, and to but 38 in 1895.[1]

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[1] "Royaume de Belgique, Chemins de fer," etc. *Compte rendu*, 1896. Brussels, 1897.

Part of this decline is perhaps only apparent, as for the former periods not all the railroads were considered, but only a fraction of them, varying between 44.06 per cent of the total mileage in 1867 to 82.70 per cent in 1888. It may perhaps be affirmed that upon the railroads thus selected, on account of their prominence, better conditions prevailed than on the other railroads then existing, and in consequence the true average load was smaller then than appears from the statistics.

The decline in the use made of passenger trains is all the more striking, however, when contrasted with the advance made in the train load of freight trains. The increasing weight and change in the composition of the track, and the more powerful locomotives now used, allow a far better use of the locomotive power in the freight traffic, and the loads have been vastly increased. The increase in train loads on American railways has been as follows:

[1] NUMBER OF PASSENGER MILES PER PASSENGER TRAIN MILE.

Year.	Number.	Year.	Number.	Year.	Number.
1867	65	1877	42	1887	43
1868	60	1878	41	1888	43
1869	59	1879	42	1889	42
1870	53	1880	46	1890	41
1871	52	1881	47	1891	42
1867–71	57.8	1877–81	43.6	1887–91	42.2
1872	52	1882	49	1892	42
1873	48	1883	46	1893	42
1874	46	1884	44	1894	44
1875	47	1885	41	1895	38
1876	47	1886	41	1896	39
1872–76	48.0	1882–86	44.2	1892–96	41.0

WEIGHT OF FREIGHT-TRAIN LOAD.

NUMBER OF TON MILES PER FREIGHT TRAIN MILE OF AMERICAN RAILWAYS.

Year.	No. of Tons.	Year.	No. of Tons.	Year.	No. of Tons.
1867 . . .	80.77	1877 . .	111.14	1887 . .	155.11
1868 . . .	82.99	1878 . .	118.90	1888 . .	154.84
1869 . . .	92.88	1879 . .	128.57	1889 . .	179.35
1870 . .	81.72	1880 . .	134.83	1890 . .	175.12
1871 . . .	91.19	1881 . .	134.92	1891 . .	181.67
1867–71 .	85.91	1877–81 .	125.67	1887–91 .	169.22
1872 . . .	84.92	1882 . .	137.55	1892 . .	181.79
1873 . . .	93.44	1883 . .	127.24	1893 . .	183.97
1874 . . .	89.01	1884 . .	132.04	1894 . .	179.80
1875 . . .	99.58	1885 . .	140.07	1895 . .	189.69
1876 . . .	110.24	1886 . .	131.94	1896 . .	198.81
1872–76 .	95.44	1882–86 .	133.77	1892–96 .	186.81

While the number of passengers per train has declined 40.0 per cent in the period from 1867 to 1896, the number of tons per freight train has increased 131.1 per cent, and while in 1867 the number of tons per freight train was only 24 per cent greater than the number of passengers per passenger train, it was 497 per cent greater in 1896.

CHAPTER XII.

LENGTH OF THE AVERAGE RAILROAD TRIP.

One of the most characteristic features of the development of railway passenger traffic is the shortening of the average journey taken. By this it is not meant that there are fewer persons now who travel a long distance than there were forty or fifty years ago. On the contrary, the number of persons who can afford the time and money to take long railway trips is rapidly increasing. In relation, however, to the total number of passengers, the number of those who travel long distance is rapidly declining, and the average distance traveled has very generally declined, while, on the other hand, the average distance which freight is hauled has simultaneously increased.

The cause of this dissimilarity in the manner in which the freight business and the passenger business have developed is evident upon an examination of the conditions to which the two forms of traffic are subject. In the first place, freight traffic must always be carried a considerable distance owing to the terminal charges. If on a ton of coal the cost of loading and unloading is thirty cents, this cost would involve charge, for this item alone, of three cents per ton-mile if the distance hauled were ten miles, one cent if hauled thirty miles, 0.3 cent for 100 miles, whereas it would only be 0.1 cent or one mill per ton-mile if the distance carried were 300 miles. Thus the terminal costs, which often form a considerable proportion of the freight charges, enable the long distance traffic to be carried relatively more cheaply than the short distance traffic, and lead to a corresponding lengthening of the haul, while the absence of such terminal charges[1] in the passenger traffic has an opposite effect. The cheapening of the cost of transportation has resulted, on the other hand, in an extension of the field from which articles may be sent and, in consequence, in an increase in the distance which commodities may economically be carried. If, for example, the price of wheat is 80 cents per bushel at a given city, wheat which cost 50 cents to produce may profitably be hauled 300 miles to the city if the freight rates are 1 mill per bushel per mile (50 cents + 300 × 0.1 cent = 80 cents); 600 miles if the rate is 0.5 mill; 1000 miles if 0.3 mill, and 1500 miles if the charge is 0.2 mill per bushel or 2 cents per 100 bushels per mile. With the cheapening of freight rates, therefore, the long distance traffic which could not be handled at first is brought to the railway and the average distance carried tends to increase.

With the cheapening of fares, on the other hand, it is not the long but the short distance travel which is relatively most favored. The railway originally appeals to the long distance travelers. Where wages are low and fares high, the man of small means finds that he cannot afford to make the frequent short journeys to and from work by means of the railroad, and short pleasure excursions by rail are equally out of the question. It is only for the longer trips where time becomes important, and walking not only fatiguing but expensive, that he is obliged to use the train. As fares decline, however, both absolutely and relatively to wages, the average individual finds that he can make a progressively increasing use of the railway for the shorter and more frequent journeys, and the culmination is reached where a great mass of the population daily use the trains to go from their homes to their places of work in the same city.

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[1] By this is meant not that there are no terminal costs in the case of the passenger traffic. There are fixed terminal charges both in freight and passenger traffic, as the items of maintenance and interest on the cost of construction of stations. But in the freight traffic there are "variable" terminal charges, costs directly ascribable to the traffic in question, such as the cost of loading and unloading, which do not appear in the passenger traffic.

The growth of cities has materially hastened the decrease in the average length of the trip, and the railways have within recent decades given an immense impetus to the traffic by the simple expedient of reducing fares. The increasing density of the population, the growth in the number of stations, and the diminution in the length of the separating distance have also had the effect of increasing the number of short at the expense of the long trips. In consequence the average trip taken is decreasing.

In the foregoing pages an attempt has been made to explain why the average journey of passengers has declined in length, while the average haul of freight has tended rather to increase. There remains to be pointed out several other features of the decline in the length of the journey, certain causes which have hastened, others which have retarded, and still others which have merely seemed to retard the tendency, to show the effect of certain exceptional conditions and circumstances upon the length of the average journey, and, finally, to point out what effect the change in the average distance traveled has had upon the cost of operation and upon railway management in general.

The statistics of the French passenger traffic show the effect of an increased traffic on the average length of railway journeys. It is to be observed, of course, that the average on French railways increases at first, owing to the construction of new lines. At first only local passenger traffic was known, and as there were no through trains the traveler was obliged to use a number of separate tickets. As the network of railways was gradually built up, however, the "*parcours*" (or average journey) increased with the possibility of more extended traveling. Thus, it increased from 17.7 kilometres in 1841 to 31.4 in 1846, 40.0 in 1851, and, finally, to 55.3 in

1855. At this period there were 5,535 kilometres, or 3,437 miles, of railway in France, and from this time on the traffic increases far more rapidly than the mileage, but at the same time the "*parcours*" rapidly decreases, falling to 39.0 kilometres in 1866, 35.1 in 1877, 32.8 in 1888, and to 31.5 in 1893. The exceptions to this rule are more apparent than real. Thus, in 1889, the average distance traveled was greater than any year since 1880, but this was due to the great exposition of 1889, which, while increasing the traffic temporarily, increased more than proportionately the amount of long distance traffic. In the same manner the exposition of 1878 caused the "*parcours*," or average journey of that year to be greater than that of any year since 1872, while the exposition of 1867 also resulted in a lengthening of the average journey of that year over that of any of the three years preceding. Wars affect the length of the average railway journey in the same manner, the railway trip for 1870 and 1871 being far longer than that of preceding years. The constant and regular decrease in the average journey becomes thus still more patent, if we leave out of consideration the temporary increase which result from wars, expositions or other inducements to long-distance travel. The table on page 165 gives the statistics of the average length of the journey in France.

The following table presents these statistics for quinquennial periods:

Period.	Average Length of Trip.[1] Kilometres.	Period.	Average Length of Trip. Kilometres.
1841–54[2] . . .	34.5	1875–79	36.0
1855–59	50.4	1880–84	34.4
1860–64	43.4	1885–89	33.4
1865–69	39.4	1890–94	31.7
1870–74	40.0		

[1] Arithmetical average of averages.

[2] For seven of the years during this period.

AVERAGE LENGTH OF TRIP ON FRENCH RAILWAYS.

Year.	Average Journey. Kilometres.
1841	17.7
1844	28.6
1845	27.9
1846	31.4
1851	40.0
1853	46.8
1854	49.0
1855	55.3
1856	50.7
1857	47.9
1858	46.4
1859	51.6
1860	44.6
1861	43.4
1862	43.8
1863	42.8
1864	42.0
1865	40.8
1866	39.0
1867	42.3
1868	37.9
1869	37.0
1870	41.6
1871	48.0
1872	38.4
1873	37.3
1874	36.7
1875	36.4
1876	36.2
1877	35.1
1878	37.8
1879	34.9
1880	35.5
1881	35.2
1882	34.7
1883	34.0
1884	32.5
1885	32.8
1886	32.9
1887	33.1
1888	32.8
1889	35.3
1890	32.9
1891	32.4
1892	32.1
1893	31.5
1894	29.4

The decrease in the distance traveled is also clearly shown in the case of the United States. From 1867 the average distance traveled on all the railways of the United States has declined continually, while the average distance hauled by freight has tended to increase. Thus, during the period 1892–96 the average trip taken was over 13 per cent less than in 1867–71, while the freight carried was hauled on an average 24 per cent farther in the first than in the second period. The following table shows the average distance carried per passenger and per ton during this period:

Year.	Average Distance Carried.		Year.	Average Distance Carried.	
	Per Passenger.	Per Ton.		Per Passenger.	Per Ton.
	Miles.	Miles.		Miles.	Miles.
1867 . .	31.24	101.23	1882 . .	26.83	108.89
1868 . .	23.48	95.88	1883 . .	27.21	111.29
1869 . .	28.04	106.02	1884 . .	26.31	114.65
1870 . .	32.79	97.67	1885 . .	25.26	117.54
1871 . .	27.62	100.87	1886 . .	25.11	114.61
1867–71 .	28.63	100.33	1882–86	26.14	113.40
1872 . .	26.59	95.68	1887 . .	24.38	116.20
1873 . .	26.23	103.89	1888 . .	24.74	116.86
1874 . .	26.11	97.08	1889 . .	24.47	127.36
1875 . .	25.85	105.88	1890 . .	24.06	119.72
1876 . .	26.80	107.22	1891 . .	24.18	120.00
1872–76 .	26.32	101.95	1887–91	24.37	120.03
1877 . .	26.39	109.02	1892 . .	23.82	124.89
1878 . .	26.21	115.58	1893 . .	23.97	125.60
1879 . .	25.24	111.73	1894 . .	26.43	125.88
1880 . .	25.24	109.19	1895 . .	24.02	122.32
1881 . .	26.72	111.10	1896 . .	25.50	124.47
1877–81 .	25.96	111.32	1892–96	24.75	124.63

It may be said, however, with a certain degree of truth, that the average distance traveled is a mere statistical figure without significance, owing to the fact that in passing from one line to another passengers may be counted twice, and because it is also difficult to calculate the traffic on commutation tickets.

This objection, however, which was raised as early as 1850, by Lardner, is apt to be exaggerated. "It may be objected to the average distances obtained in this way that, although they are correct for any system of railways conducted under single management, yet, that as passengers who start from a station on one railway pass successively during the same trip over the lines of one or more other companies, they will figure in the returns as so many different passengers booked; they will therefore unduly augment the divisor by which the mean distances are calculated, and, therefore, give average distances under the truth."[1] The error thus occasioned, however, is not sufficiently great to invalidate the conclusions. Mr. Lardner obtained from the Railway Clearing House a statement for the year 1845 of all passengers passing from one line to another, and while the average distance traveled by these through passengers was eight times that of the average, their number was so inconsiderable as not to increase the average mileage to a greater extent than from 18.2 to 18.8 miles in 1845, and from 16.5 to 16.7 in 1848.[2] The length of British and Irish railways was only 41 miles in 1845 and 80.7 miles 1848, and it is fair to assume that to-day the proportion of through traffic bears a still smaller per cent of the whole traffic than it did in 1848, and that for most countries the range of probable error in the average distance traveled is within a very few per cent.[2]

The following table shows the mean distance traveled by passengers on British railways in the forties. In more recent times these figures are not given:

AVERAGE DISTANCE TRAVELED.[3]

Year. June 30.	First Class. Miles.	Second Class. Miles.	Third Class. Miles.	All Classes. Miles.
1843	26.00	14.40	12.50	16.10
1844	26.00	14.40	12.50	16.03
1845	26.00	14.40	12.50	15.57
1846	29.50	18.33	14.33	18.22
1847	24.40	14.70	14.16	15.74
1848	25.00	16.00	13.00	15.65

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[1] Lardner. Railway Economy, pp. 168, 169.

[2] The range of error is somewhat minimized by Lardner owing to what appears to be a false method of calculation.

[3] Lardner, pp. 167, 168.

In Italy, also, there is a tendency for the average length of the railway journey to diminish. According to the "Annuario Statistico Italiano" (1895), the average length of the trip on Italian railways is as follows:

Year.	Average Length of Trip. Kilometers	Year.	Average Length of Trip. Kilometers.
1872	47.2	1882	48.1
1873	46.2	1883	47.1
1874	45.4	1884	45.0
1875	46.0	1885	43.7
1876	47.3	1886	43.6
1877	48.6	1887	46.1
1878	48.0	1888	46.5
1879	47.3	1889	44.3
1880	46.9	1890	43.5
1881	48.2		

While this development is irregular, the trend is decidedly downward:

	Kilometers.
Mean length of journey, 1872–77	46.8
Mean length of journey, 1878–83	47.6
Mean length of journey, 1884–90	44.7

This development is the more obvious when we discover that in the second period, 1878–1883, the passenger traffic (number of travelers) advanced but 20 per cent, whereas in the third period it advanced 38 per cent.

Mean number of passengers, 1872–77	27,150,000
Mean number of passengers, 1878–83	32,700,000
Mean number of passengers, 1883–90	45,150,000

The length of the average distance traveled on Italian railroads is due, primarily, to the comparatively small traffic and perhaps to the geographical contour of the country.

The following results are taken from official Norwegian statistics:

AVERAGE LENGTH OF TRIP ON NORWEGIAN RAILROADS.

Year.	Kilometers.	Year.	Kilometers.	Year.	Kilometers.	Year.	Kilometers.
1856	32.0	1867	34.8	1877–78	31.0	1888–89	27.2
1857	33.2	1868	35.8	1878–79	32.0	1889–90	26.8
1858	32.5	1869	31.8	1879–80	30.7	1890–91	27.0
1859	21.8	1870	31.4	1880–81	31.0	1891–92	26.9
1860	31.4	1871	31.8	1881–82	30.9	1892–93	23.6
1861	36.1	1872	30.4	1882–83	30.9	1893–94	22.9
1862	35.5	1873	29.4	1883–84	29.5	1894–95	23.0
1863	33.8	1874	27.6	1884–85	28.7		
1864		1875	28.1	1885–86	29.2		
1865		1876	28.3	1886–87	28.8		
1866		1877	29.1	1887–88	28.7		

From this table it is apparent that the average length of the railroad journey increased during the period of railroad construction, reaching its highest level, 35.8 kilometers (22.2 miles) in 1868, since when, with the exception of a temporary increase from 1874 to 1878–79, it has steadily declined to 23.0 kilometers (14.3 miles) in 1894–95.

In Württemberg, however, the tendency toward a decrease in the average journey has been less marked.

AVERAGE LENGTH OF JOURNEY ON WÜRTTEMBERG RAILWAYS.

Year.	Kilometers.	Year.	Kilometers.
1852	21.60	1867	26.07
1853	21.60	1868	24.21
1854	24.50	1869	21.83
1855	21.84	1870	21.68
1856	24.58	1871	22.20
1857	23.84	1872	23.82
1858	23.84	1873	23.12
1859	24.95	1874	24.01
1860	24.58	1875	21.94
1861	26.07	1876	22.35
1862	26.44	1877	22.32
1863	24.95	1878	23.01
1864	24.20	1879	23.19
1865	23.09	1880	24.39
1866	23.39	1881	23.55

Year.	Kilometers.	Year.	Kilometers.
1882	24.97	1892	20.65
1883	24.31	1893	21.02
1884	23.75	1894	20.91
1885	24.18		
1886	23.06		
1887	22.59		
1888	22.10		
1889	21.97		
1890	21.89		
1891	22.03		

The following résumé of the foregoing table shows this development more clearly:

Period.	Average Length of Journey.	Period.	Average Length of Journey.
1852–56	22.8	1877–81 . . .	23.2
1857–61	24.6	1882–86 . . .	24.0
1862–66	24.4	1887–91 . . .	22.0
1867–71	23.2	1892–94 . . .	20.8
1872–76	23.0		

The tendency for the average journey to decline is considerably less in countries with a small area.

It is to be observed, moreover, in the United States, as elsewhere, that not only is there a change with reference to time, but with reference to location as well. As the average length of the journey becomes smaller with the increase of the traffic of the country, so do we find that in those parts of the country which have the largest traffic there is also the smallest average journey. Taking the eight groups given by Poor, as a basis, we find for 1894 the following average journeys :

Group.	Miles.	Group.	Miles.
I	14.34	V	36.93
II	17.82	VI	53.40
III	27.65	VII	61.09
IV	34.59	VIII	29.39

Groups I, II, III and VIII, which are first, second, third and fourth in the order of intensity of traffic, have the same order in smallness of the average journey, and their four ratios average but 22.30 miles, while the mean of the remaining four (46.50 miles) is considerably higher.

It is also interesting to note that in the third class, which has been rapidly absorbing the traffic of the higher classes in most countries, there is a far shorter average journey than in other classes. Thus, in Prussia, while 46.9 per cent of all passengers travel less than ten kilometers (6.2 miles), the percentage of such short distance riders in the third class is over 61.4 per cent, and while on the first class about one passenger in three travels 200 kilometers (124 miles), or over, the percentage for the second class is only one in fourteen, and for the third class but one in seventy-six.[1] In Bavaria the same general result is observed. While in 1894 the average passenger in the first class traveled 178.79 kilometers, in the second class 85.20 kilometers, and in the military class 67.91 kilometers, the average third class traveler averaged only 27.67 kilometers. The accommodation trains, which are largely made up of third class passengers, averged but 28.43 kilometers, while the passengers on express trains traveled on an average 125.40 kilometers.[2]

The accompanying statistics for Hungarian passenger traffic demonstrate the same fact. While, for the suburban traffic (one banlieue) the third class represents over six-sevenths of the traffic, its proportion gradually decreases with the distance until in the fourteenth zone it reaches its lowest point. This shows, again, that the growth of the third class traffic and the diminution of the length of the average journey go hand in hand.

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[1] Hille.

[2] Report, 1894.

AVERAGE LENGTH OF JOURNEY IN KILOMETERS.

Group.	First Class.	Second Class.	Third Class.
1 Banlieue	0.46	13.56	85.98
2 Banlieue	0.60	14.57	84.83
I	1.83	16.51	81.66
II	1.75	17.23	81.02
III	1.83	20.74	77.43
IV	2.15	22.93	74.92
V	2.42	23.18	74.40
VI	2.35	21.62	76.03
VII	2.19	24.20	73.61
VIII	2.46	22.94	74.60
IX	3.11	25.65	71.24
X	3.08	25.44	71.48
XI	3.77	24.16	72.07
XII	3.57	22.61	73.82
XIII	5.05	24.42	70.53
XIV	3.52	26.05	70.43

The Norwegian statistics (Report 1894–95) also show this tendency, the average trip of the third class being hardly one-seventh of that of the first class:

AVERAGE JOURNEY ON NORWEGIAN RAILWAYS.

Class.	Length. Kilometers.
I	146.2
II	41.7
III	21.4
All	23.1

The following table, from the "Reforme delle Tariffe," etc., shows that in Italy, Germany, Belgium, Austria, Hungary, Holland, Roumania and Russia the third class passenger travels a less distance than do the first or second class passengers. The fourth class passenger, where such exists, also travels a shorter distance than do those of the first and second class:

LENGTH OF JOURNEY IN KILOMETERS.

Country.	Year.	Class I.	Class II.	Class III.	Class IV.	Average.
Italy	1892	89.75	50.73	38.45	24.60	43.66
France . . .	1892	60.65	22.83	31.99	.	30.71
Germany . .	1892	90.86	36.74	20.99	26.16	24.30
Belgium . .	1891	42.97	31.51	18.57	. .	21.05
Austria . . .	1892	90.87	54.77	33.66	18.34	36.10
Hungary . .	1892	104.57	60.54	34.29	. . .	40.15
Netherlands	1892	39.29	29.45	22.65	12.74	24.92
Roumania .	1892	104.63	85.91	63.09	. . .	68.26
Russia . . .	1891	279.61	159.03	97.03	. . .	103.04

It would be possible to multiply indefinitely instances of this decrease in the "parcours," or the mean distance traveled. The development, however, is sufficiently clear. (See, however, table, page 174.) The *parcours* has at first a tendency to increase with the increase in railway mileage and with the possibility of making extended trips. As soon as the railway network is fairly built up, however, there is a strong tendency for the average trip to decrease. The more intense the traffic and the more dense the population, the smaller the average journey tends to become, and this development is exemplified by variations in the passenger traffic of a country at different periods, or of different countries at the same period. This development goes hand in hand with the absorption of traffic by the third-class trains, the third-class passengers traveling the shortest distance, and the increase of third-class traffic coinciding with the decrease in the average length of the journey made. The decrease in the average trip is largely due to the rise of the suburban traffic, but it is subject to interruptions caused by wars, great expositions, etc., which cause men to travel long distances. The

SAXONY.

PERCENTAGE OF PASSENGERS TRAVELING FOLLOWING DISTANCES.

Year.	0-6.2 Miles.	6.2-12.4 Miles.	12.4-18.6 Miles.	18.6-24.8 Miles.	24.8-31.1 Miles.	31.1-37.3 Miles.	37.3-43.5 Miles.	43.5-49.7 Miles.	49.7-55.9 Miles.	55.9-62.1 Miles.	62.1-68.3 Miles.	68.3-74.5 Miles.	Over 74.5 Miles.
1880 . .	33.96	29.72	11.34	7.28	4.86	2.82	2.40	1.64	1.27	0.49	0.98	1.70	1.54
1881 . .	34.09	29.48	11.34	7.35	4.94	2.89	2.42	1.59	1.23	0.47	0.98	1.67	1.55
1882 . .	34.44	29.06	11.44	7.36	4.95	2.86	2.43	1.61	1.24	0.47	0.97	1.62	1.55
1883 . .	34.75	28.89	11.59	7.40	4.81	2.88	2.38	1.56	1.24	0.46	0.96	1.58	1.50
1884 . .	34.98	28.94	11.47	7.30	4.74	2.77	2.48	1.64	1.27	0.47	0.93	1.57	1.44
1885 . .	35.60	28.94	11.32	7.14	4.64	2.80	2.36	1.58	1.26	0.48	0.97	1.50	1.41
1886 . .	36.23	28.98	11.18	7.10	4.53	2.71	2.37	1.55	1.22	0.48	0.88	1.40	1.37
1887 . .	36.92	28.74	10.84	7.02	4.45	2.71	2.40	1.60	1.21	0.46	0.90	1.41	1.34
1888 . .	38.26	27.95	10.61	6.78	4.25	2.12	2.26	1.59	1.11	0.52	0.83	1.48	1.24
1889 . .	39.12	27.82	10.46	6.50	4.23	2.91	2.25	1.47	1.13	0.55	0.84	1.49	1.23
1890 . .	39.71	27.75	10.30	6.38	4.17	2.89	2.19	1.42	1.13	0.54	0.82	1.44	1.23
1891 . .	40.55	27.75	10.10	6.24	4.02	2.79	2.12	1.38	1.10	0.51	0.82	1.43	1.19
1892 . .	41.16	27.60	10.02	6.17	3.94	2.74	2.11	1.37	1.07	0.47	0.78	1.36	1.21
1893 . .	41.96	27.31	9.75	6.15	3.83	2.67	2.04	1.38	1.04	0.49	0.78	1.34	1.26
Increase,	8.00	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Decrease,	. .	2.41	1.59	1.13	1.03	0.15	0.36	0.26	0.23	0.00	0.20	0.36	0.28
		5.59	4.00	2.87	1.84	1.69	1.33	1.07	0.84	0.84	0.64	0.28	0.00

tendency toward shorter trips is not to be deplored, as it indicates an increasing activity in passenger traffic, although it may and frequently does have a bad effect in increasing the percentage of operating expenses.

The average length of the trip has remained fairly constant in Denmark for the last eighteen years.[1]

Year.	Length of Trip. Kilometers.	Year.	Length of Trip. Kilometers.	Year	Length of Trip. Kilometers.
1880–81 .	29.5	1886–87	28.8	1892–93	29.2
1881–82 .	29.9	1887–88	29.0	1893–94	29.0
1882–83 .	29.1	1888–89	31.0	1894–95	28.6
1883–84 .	28.9	1889–90	29.0	1895–96	28.6
1884–85 .	28.9	1890–91	29.7	1896–97	29.1
1885–86 .	29.1	1891–92	29.2	1897–98	31.3
Average	29.3	Average	29.5	Average	29.4

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[1] Danske Statsbaner, p. viii.

CHAPTER XIII.

THE GROWTH OF THIRD-CLASS TRAVEL AND THE DECLINE IN FARES.

A superficial study will convince us that there has been everywhere a tendency for the third-class passenger traffic to increase at the expense of the higher classes. In fact, the most effective way in which fares have been cheapened has been by the increasing preponderance of the cheaper forms of traffic. In 1887, Mr. Jeans, in his work on "Railway Problems," pointed out the fact that the third class was rapidly displacing the first and second class traffic. To-day this process is still more evident, and already the great mass of the traffic in all countries, where there is a division of classes, belongs to classes lower than the first and second. Thus, in Great Britain and Ireland slightly over 90 per cent of the whole traffic is third class; in Norway the percentage is 92.4 per cent; in Wurtemberg 91.81 per cent; in Finland 87.5 per cent; in Denmark 86.7 per cent; in Belgium (private railways) 84.89 per cent; in Belgium (state railways) 84.2 per cent; in Sweden 84 per cent; in Austro-Hungary 84.82 per cent; in Switzerland 82.59 per cent; in Alsace-Lorraine 78.57 per cent. In countries where there exists a large fourth class, the percentage appears smaller, but the proportion of cheaper traffic is really greater. Thus, Prussia, which is credited with but 50.63 per cent third-class traffic, has 89.33 per cent third, fourth and military traffic; Russia has 87.6 per cent third class and 4.3 per cent fourth class, and Saxony has 91.49 per cent third and fourth-class traffic. In other words, not one traveler in four rides first or second class in the Netherlands; not one in five in Switzerland and Alsace-Lorraine; not one in six in Sweden and Belgium;

not one in seven in Austro-Hungary and Denmark; not one in eight in Finland and Prussia; not one in ten in Great Britain, Saxony, Wurttemberg, Norway and Russia.

This tendency to ride lower class is, moreover, on the increase. In 1882, 73 per cent of Austro-Hungarian travelers used third class, 1891 the percentage was 84.8 per cent. In France the percentage of travelers riding first class diminished from 11 per cent to 8 per cent; of second-class travelers from 41 per cent to 33 per cent, while those riding third class increased from 48 per cent to 59 per cent during the period from 1853 to 1883.[1] From 1884 to 1893 first-class travelers on Russian railways diminished 13 per cent; second class 3 per cent, while third class increased 24 per cent. In German railways from 1884–85 to 1893–94, the third class increased 83 per cent; the second class, however, but 58 per cent, while the first class diminished 9 per cent. During the ten years ending 1894 the first-class traffic on English railways decreased 14 per cent; the second class 3 per cent, while the third class increased 37 per cent. From 1886 to 1894 the third class on the Bavarian railways increased from 86.59 to 89.41 per cent of the whole number of passengers, and similar instances might be cited from the railway statistics of the other countries.[2]

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[1] From 1883 to 1891 the percentage of third-class travelers has diminished somewhat less than 2 per cent, the gain being made by the second class. Since 1892, however, there has been a very rapid accession of third-class traveling owing to a greater reduction of third-class fares than of those of other classes.

[2] The amount of revenue obtained from a single third-class passenger is considerably less than that derived from any of the other classes, owing to the cheapness of the fare and the shortness of the trip. But the percentage of income derived from the cheaper traffic is large and constantly growing. Wurttemberg obtains 76.24 per cent of its entire passenger receipts from the third class (including military travelers); Norway 78.1 per cent; Great Britain and Ireland 82.5 per cent; Austro-Hungary 63.45 per cent; Belgium (private railways) 68.85 per cent; state railways 59 per cent; Finland 71.9 per cent; Switzerland 61.99 per cent; Alsace-Lorraine 52.36 per cent; Prussia 40.70 per cent (including fourth class 68.82 per cent). The Gotthard Railway receives but 37.70 per cent of total passenger income from this third-class traffic.

The following table shows the percentage of passengers by classes on Prussian railways from 1856 to 1880:

Year.	I	II	III	IV	Year.	I	II	III	IV
1856. .	3.5	33.0	53.7	9.8	1871 .	3.3	24.3	44.0	28.4
1857. .	3.5	31.3	50.6	14.6	1872 .	3.5	22.7	42.6	31.2
1858. .	3.2	28.5	48.1	20.2	1873 .	3.3	21.2	43.4	32.2
1859. .	3.1	26.4	48.0	22.5	1874 .	3.1	21.2	43.5	32.2
1860. .	3.3	27.1	48.2	21.4	1875 .	3.1	21.1	43.5	32.3
Average	3.3	29.3	49.7	17.7	Average	3.3	22.0	43.3	31.4
1861. .	3.4	26.7	48.2	22.0	1876 .	3.0	20.3	43.5	33.2
1862. .	3.7	26.4	45.7	24.2	1877 .	2.7	19.5	44.1	33.7
1863. .	3.4	25.1	45.0	26.5	1878 .	2.9	19.5	44.3	33.3
1864. .	3.3	24.3	43.1	29.3	1879 .	2.6	19.0	45.0	33.4
1865. .	3.3	23.4	41.7	31.6	1880 .	2.6	19.1	44.7	33.6
Average	3.4	25.0	44.6	27.0	Average	2.8	19.5	44.3	33.4
1866. .	2.9	22.2	38.8	36.1					
1867. .	3.5	23.7	39.9	32.9					
1868. .	3.0	23.2	44.4	29.4					
1869. .	3.1	22.9	44.7	29.3					
1870. .	2.9	23.0	45.3	28.8					
Average	3.1	22.9	42.7	31.3					

The following table shows the percentage of passengers by classes on French railroads:

Year.	First Class.	Second Class.	Third Class.	Total.
1886	7.6	34.0	58.4	100.0
1887	7.4	34.0	58.6	100.0
1888	7.6	34.3	58.1	100.0
1889	7.6	36.1	56.3	100.0
1890	7.6	33.7	58.7	100.0
1891	7.3	34.5	58.2	100.0
1892	6.4	32.4	61.2	100.0
1893	6.2	31.7	62.1	100.0
1894	6.0	31.6	62.4	100.0
1895	5.9	31.7	62.4	100.0
1896	5.8	31.5	62.7	100.0

Simultaneously with the increase in the number of lower class passengers, and in some cases partially as a result thereof, there has come a decline in the average fare. Thus during the thirty years ending in 1896 the following development took place in rates and fares on American railroads:

DECLINE OF PASSENGER FARES.

Year.	Revenue from freight per ton mile.	Revenue per ton mile in per cent of 1867.	Revenue from passengers, per mile.	Revenue per passenger mile in per cent of 1867.
	Cents.	Per cent.	Cents.	Per cent.
1867	1.925	100.0	1.994	100.0
1872	1.846	95.9	2.521	126.4
1877	1.286	66.9	2.458	123.3
1882	1.102	57.2	2.391	119.9
1887	.984	51.1	2.245	112.6
1892	.898	46.7	2.126	106.6
1896	.806	41.9	2.019	101.3

From this table it would appear that while freight rates in America have decreased to about two-fifths of their former amount, passenger fares far from declining have actually advanced. The average fare paid per passenger per mile, according to these statistics, was less in 1867 than in 1897, or, in fact, in any year since 1867, except 1894. It might be answered, however, that the railway rates prevailing in 1867 were unusually low, and that if all companies were considered instead of the small proportion of the then existing mileage, the higher rates on the less known railways would bring up the rates given in the table to a point considerably higher.[1]

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[1] "It is a fact which may be verified, as well as one which would be naturally inferred, that the railways earliest to adopt accounting methods that make it possible to secure statistics . . . were those operating more than the average mileage, receiving more than the average amount of traffic per mile of line, and, consequently, able to conduct their operations with lower relative expenditures, and likely to charge lower rates." (Page 15.)—Report of the Department of Agriculture on Changes in Rates and Fares upon American Railways. The tables on early passenger fares in the United States have been worked out from the data given in this excellent report.

TABLE 2.

AVERAGE REVENUE PER PASSENGER MILE ON AMERICAN RAILWAYS.

Year.	Cents.	Year.	Cents.
1867	1.994	1883	2.402
1868	2.164	1884	2.323
1869	2.144	1885	2.216
1870	2.392	1886	2.142
1871	2.632	1887	2.245
1872	2.521	1888	2.108
1873	2.486	1889	2.165
1874	2.544	1890	2.167
1875	2.378	1891	2.142
1876	2.183	1892	2.126
1877	2.458	1893	2.108
1878	2.573	1894	1.986
1879	2.484	1895	2.040
1880	2.442	1896	2.019
1881	2.446	1897	
1882	2.391	1898	

The figures given in Table 2 would seem to indicate that fares were abnormally low in 1867, or that they increased from 1867 until 1871, and then declined; but even if we take the average for quinquennial periods, as in Table 3, we do not find any rapid or continuous decline. The figures for 1867, moreover, are not abnormally low. The report of the Department of Agriculture, for instance, shows that for each of the

TABLE 3.

Period.	Revenue per passenger mile.	In per cent of period 1867–71.
	Cents.	Per cent.
1867–71[1]	2.265	100.0
1872–76	2.423	107.0
1877–81	2.481	109.5
1882–86	2.295	101.3
1887–91	2.165	95.6
1891–96	2.056	91.6

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[1] The figures considered here are not the true averages, but are in each case the arithmetical mean of the yearly averages.

other years, from 1863 to 1869, the fares upon the Boston & Maine Railway were lower than in 1867, while as early as 1851 we find that the average rate paid per passenger mile was lower than in 1897. On the Illinois Central the fares for 1867 were greater than in any previous year, being considerably over twice as high as in 1864. The figures, in fact, show that for almost every railway cited, fares were considerably higher in 1867 than in the preceding years. The period of cheapest fares appears to have been in 1864.[1] During the early fifties the fares seemed to have remained without any violent fluctuations, at a somewhat higher level than at present. This may be seen from the statistics of average fares on various railways given in Table 4.

TABLE 4.

Year.	Boston & Maine Railway.	Illinois Central Railway.	Pittsburg, Fort Wayne & Chicago Railway.	Baltimore & Ohio Railway.	New York, New Haven & Hartford Railroad.
	Cents.	Cents.	Cents.	Cents.	Cents.
1850	1.959	. . . .	. . . .	. . . .	. . . .
1851	1.739	. . . .	. . . .	2.179	. . . .
1852	1.759	. . . .	. . . .	2.100	. . . .
1853	1.796	. . . .	. . . .	. . . .	. . . .
1854	1.942	. . . .	. . . .	. . . .	. . . .
1855	1.976	. . . .	. . . .	3.055	. . . .
1856	1.999	. . . .	. . . .	2.590	. . . .
1857	2.016	2.000	2.438	2.610	. . . .
1858	2.045	2.499	2.531	2.793	1.961
1859	2.015	2.109	2.558	2.729	2.103
1860	1.976	2.165	2.646	2.795	2.111
1861	1.938	2.432	2.493	. . . .	2.063
Average of years preceding 1862	1.930	2.241	2.533	2.606	2.060
Average 1893–97 . . .	1.774	1.975	. . . .	1.690	1.784
Average 1893–96 . . .	. . . .	. . . .	1.98	. . . .	. . . .

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[1] The fares are calculated during the period of currency inflation on a specie basis, but it can be readily understood that it was impossible for the railroads to increase their fares progressively as the premium on gold advanced, and the fare measured in gold would, therefore, naturally be smaller during such a period.

TABLE 5.

RECEIPTS PER PASSENGER MILE FROM 1861 TO 1866 INCLUSIVE.

Railway.	1861. Cents.	1862. Cents.	1863. Cents.	1864. Cents.	1865. Cents.	1866. Cents.
Boston & Maine	1.938	1.758	1.459	1.095	1.201	1.621
Illinois Central	2.432	2.012	1.750	1.319	1.741	2.468
Pittsburg, Ft. Wayne & Chicago	2.493	2.334	1.809	1.358	1.583	2.083
New York, N. H. & Hartford	2.063	1.922	1.379	1.145	1.237	1.637
Boston & Albany	2.66	2.519	1.863	1.466	1.762	2.165
Erie	2.066	1.901	1.657	1.188	1.615	1.607
Chicago, Rock Island & Pacific	...	...	2.098	1.661	1.937	2.634
Allegheny Valley	...	...	2.349	1.915	2.287	2.715
Michigan Central	...	...	1.761	1.323	1.469	1.922
Long Island	...	...	1.600	1.415	1.131	1.343
Troy & Boston[1]	3.161	2.995	2.701	2.346	2.231	2.274
Ogdensburg & Lake Champlain[2]	2.593	2.378	1.908	1.477	1.835	2.271
Utica & Black River[3]	2.995	2.929	2.324	1.970	2.126	2.671
Rome, Watertown & Ogdensburg[3]	3.226	3.100	2.469	1.825	1.799	2.378
Oswego & Syracuse[4]	2.658	2.616	1.792	1.628	1.939	2.544
Syracuse, Bingham, & New York[4]	2.672	2.530	1.900	1.447	1.500	1.863
Cayuga & Susquehanna[4]	3.438	3.346	2.521	1.951	2.103	3.288
Rensselaer & Saratoga[5]	2.996	...	2.091	1.959	2.125	2.645

During the war, however, the receipts (in specie) per passenger per mile declined rapidly to a point usually far below present rates, the minimum being reached in 1864. The preceding table (No. 5) shows that in each of the eighteen railways for which the statistics were available, the receipts per passenger mile declined steadily from 1861 to 1864, while in all but three of the lines considered, the rate of fare increased immediately in 1865. Upon the basis of the figures at our disposal we may see, therefore, that during the fifties passenger fares on American railways were not far above those of the present day; that from 1861 to 1864 these fares (measured in gold) declined to a point considerably lower than the average fare of to-day, and that they then rose rapidly and with considerable regularity until 1871, while during the seventies they maintained fairly well their high level. Since 1880, however, there has been a gradual diminution in fares, the decline amounting to about one-sixth of the fare as it existed in 1860.

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[1] Now operated by Fitchburg Railway. [2] Now Central Vermont. [3] Now New York Central & Hudson River. [4] Now Delaware, Lackawanna & Western. [5] Now Delaware & Hudson.

A fair comparison of normal passenger fares, as existing in 1848 and in 1898, may be obtained from the "Report of the Department of Agriculture upon Rates and Fares upon American Railways," before cited. The figures given there are reproduced in the following tables, and the fares for 1898 have been expressed in terms of those of 1848, and a simple average made for twelve interstate routes, for twenty-four routes in New England on the Boston & Maine, Fitchburg, and Boston & Albany railways, and for twelve routes in Pennsylvania, on the Philadelphia & Reading and on the Pennsylvania railways. While the distances range from seven to 202 miles, there was but one route for which the fare has been increased, while in all but three of the forty-eight routes there has been a decline in the fare paid. This decline, however, has not been very great. The average decline amounted to about two-ninths (21.2 per cent)

INTERSTATE ROUTES.

From	To	Distance. Miles.	Rate, 1848. Dollars.	Rate, 1898. Dollars.	Rate of 1898 in per cent of that of 1848. Per cent.	Arithmetical Mean. Per cent.
Boston, Mass.	Albany	202	5.00	4.50	90	78.8
"	Fitchburg, Mass.	50	1.25	1.25	100	
"	Portland, Me.	115	3.00	2.50	83	
"	Providence, R. I.	49	1.25	1.00	80	
New York	Philadelphia, Pa.	91	4.00	2.50	63	
Philadelphia	Harrisburg, Pa.	105	4.00	3.15	79	
"	Baltimore, Md.	96	3.00	2.80	93	
"	Havre de Grace, Md.	60	2.25	1.77	79	
Baltimore	Annapolis, Md.	26	1.60	1.00	67	
"	Washington, D. C.	40	2.00	1.20	60	
"	Frederick, Md.	62	2.50	1.75	70	
"	Cumberland, Md.	192	6.50	5.25	81	

for the interstate routes, to about one-fifth (19.7 per cent) for the Pennsylvania, and less than one-seventh (13.5 per cent) for the Massachusetts routes.

The fact that in the earlier years chiefly the better known and better managed railways were included in the statistics, whereas, for the latter years the statistics include all railroads, has probably caused the decline in fares to appear somewhat less than it really is. The difference can not be very great, however.

During the period from 1871–75 to 1891–97, the statistics of receipts per passenger mile upon the railways of the State of Massachusetts (see page 185) show a decline of about one-quarter (24 per cent) from the maximum fares of

NEW ENGLAND ROUTES.

From Boston to	Via Railroad.	Distance. Miles.	Rate, 1848. Dollars.	Rate, 1898. Dollars.	Rate of 1898 in per cent of that of 1848. Per cent.	Arithmetical Mean. Per cent.
Salem, Mass. . . .	Boston & Maine .	16	0.40	0.35	88	86.5
Beverly, Mass. . .	"	18	0.45	0.40	89	
Wenham, Mass. . .	"	23	0.56	0.52	93	
Ipswich, Mass. . .	"	28	0.70	0.65	93	
Rowley, Mass. . .	"	31	0.80	0.74	93	
Newburyport, Mass.	"	37	1.00	0.90	90	
Portsmouth, N. H. .	"	57	1.50	1.40	93	
Saco, Maine . . .	"	95	2.90	2.40	83	
Portland, Maine . .	"	115	3.00	2.50	83	
Reading, Mass. . .	"	12	0.30	0.25	83	
Andover, Mass. . .	"	23	0.60	0.52	87	
Haverhill, Mass. .	"	33	0.85	0.75	88	
Exeter, N. H. . . .	"	51	1.30	1.20	92	
Dover, N. H. . . .	"	68	1.75	1.60	92	
Waltham, Mass. . .	Fitchburg Railway	10	0.25	0.17	68	
Concord, Mass. . .	"	20	0.50	0.40	80	
Fitchburg, Mass. .	"	50	1.25	1.25	100	
Natick, Mass. . . .	Boston & Albany .	17	0.45	0.40	89	
Worcester, Mass. .	"	44	1.25	1.00	80	
Palmer, Mass. . . .	"	84	2.25	1.90	84	
Springfield, Mass. .	"	99	2.75	2.23	81	
Westfield, Mass. . .	"	108	2.95	2.43	82	
Dalton, Mass. . . .	"	145	3.90	3.29	85	
Pittsfield, Mass. . .	"	151	4.00	3.26	82	

PENNSYLVANIA ROUTES.

From Philadelphia to	Via Railroad.	Distance. Miles.	Fare, 1848. Dollars.	Fare, 1898. Dollars.	Rate of 1898 in per cent of that of 1848. Per cent.	Arithmetical Mean. Per cent.
Manayunk, Pa. . .	Phila. & Reading	7	0.25	0.15	60	80.3
Norristown, Pa. . .	" "	17	0.40	0.50	125	
Phœnixville, Pa. . .	" "	28	1.00	0.81	81	
Pottstown, Pa. . .	" "	41	1.60	1.20	75	
Reading, Pa. . .	" "	59	2.25	1.75	78	
Hamburg, Pa. . .	" "	76	2.90	2.26	78	
Schuylk'l Haven, Pa.	" "	90	3.40	2.47	73	
Pottsville, Pa. . .	" "	94	3.50	2.80	80	
Paoli, Pa. . .	Pennsylvania.	20	0.75	0.50	67	
Downingtown, Pa.	"	32	1.00	0.81	81	
Lancaster, Pa . .	"	69	2.50	2.05	82	
Columbia, Pa. . .	"	81	2.87½	2.40	83	

TABLE 11.[1]

AVERAGE FARE PER PASSENGER MILE—(ALL MASSACHUSETTS ROADS).

Year.	Fare. Cents.	Year.	Fare. Cents.	Year.	Fares. Cents.
1871	2.51	1880 . . .	2.05	1889 . . .	1.87
1872	2.43	1881 . . .	2.02	1890 . . .	1.82
1873	2.32	1882 . . .	2.00	1891 . . .	1.83
1874	2.30	1883 . . .	2.00	1892 . . .	1.83
1875	2.30	1884 . . .	1.92	1893 . . .	1.83
1876	2.23	1885 . . .	1.88	1894 . . .	1.80
1877	2.22	1886 . . .	1.88	1895 . . .	1.78
1878	2.18	1887 . . .	1.85	1896 . . .	1.79
1879	2.11	1888 . . .	1.90	1897 . . .	1.80

AVERAGE FARE.

Period.	Fare. Cents.	Fare in per cent of 1871-75.
1871–75	2.37	100
1876–80	2.16	91
1881–85	1.96	82
1886-90	1.86	78
1891–97	1.81	76

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[1] Page 67. Commonwealth of Massachusetts. Twenty-ninth Annual Report of the Board of Railroad Commissioners, Boston, 1898.

1871. The report makes the receipts for 1865 higher than for 1870, but this is due to the fact that they have taken currency receipts at their nominal instead of at their gold value.

The reduction of fares on Continental railways has been considerably more radical. In 1865 the average passenger on Belgium railways paid 26.4 cents; in 1870, 22.0 cents; in 1875, 16.2 cents; in 1885, 15.6 cents; in 1890, 13.5 cents, and in 1897, 12.2 cents. During these thirty-two years, the decline in the amount paid per passenger was 54 per cent, although part of this was undoubtedly due to the fact that in later years the number of short trips has disproportionately increased. The decline in fares on Prussian railways (1860–95) was 33.3 per cent, (from 1850–95, 38.6 per cent), and on French railways 25.6 per cent from 1867–94; 33.7 per cent from 1855; 43.2 per cent from 1851, and 49.6 per cent from 1831 to 1894.

In Prussia the decline in fares, though not radical, has been somewhat more greater than in the United States, as may be seen from the following table:

RECEIPTS PER PASSENGER MILE (IN CENTS) ON PRUSSIAN RAILWAYS.[1]

Year.	Receipts, in cents.	Year.	Receipts, in cents.	Year.	Receipts, in cents.
1844	1.74	1860	1.65	1876	1.39
1845	1.79	1861	1.63	1877	1.39
1846	1.68	1862	1.62	1878	1.39
1847	1.68	1863	1.54	1879	1.37
1848	1.64	1864	1.47	1880–81	1.39
1849	1.73	1865	1.49	1881–82	1.37
1850	1.75	1866	1.25	1882–83	1.36
1851	1.81	1867	1.46	1883–84	1.35
1852	1.84	1868	1.44	1884–85	1.33
1853	1.91	1869	1.42	1885–86	1.30
1854	1.82	1870	1.19	1886–87	1.34
1855	1.79	1871	1.25	1887–88	1.28
1856	1.77	1872	1.37	1888–89	1.27
1857	1.73	1873	1.35	1889–90	1.23
1858	1.67	1874	1.37	1890–91	1.18
1859	1.59	1875	1.40		

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[1] Statistisches Handbuch für den Preussischen Staat. Berlin, 1893. Vol. II, page 304.

The following table shows the same result for longer periods:

RECEIPTS PER PASSENGER MILE ON PRUSSIAN RAILWAYS.

Period.	Cents, per mile. Cents.	Corrected table.[1] Cents.	In per cent. of 1844-48. Per cent.
1844-48	1.71	1.71	100
1849-53	1.81	1.81	106
1854-58	1.76	1.76	103
1859-63	1.61	1.61	94
1864-68	1.42	1.47	87
1869-73	1.32	1.38	81
1874-78	1.39	1.39	81
1879-83-84	1.37	1.37	80
1884-85-88-89	1.30	1.30	76

The decline in fares on Saxon railways has been as follows:

RECEIPTS PER PASSENGER MILE ON SAXON STATE RAILWAYS.[2]

Year.	Receipts per kilom. Pfennigs.	Receipts per mile in cents	Receipts in per cent of 1847.
1847	4.43	1.718	100.0
1857	4.00	1.552	90.3
1867	3.77	1.463	85.2
1877	3.46	1.342	78.2
1887	3.29	1.277	74.7

There has been a steady decline of fares in France from the earliest days of railroading down to the present time. In 1855 the railroads received 1.84 cents per passenger mile (not including the duty), but the rate steadily and gradually declined to 1.72 cents in 1865; to 1.62 cents in 1875, and to 1.47 cents in 1884.

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[1] Leaving 1866 out of group 1864-68, and 1870 and 1871 out of group 1869-73.

[2] Personen und Güterverkehr auf den unter Königl. Sächs. Staatsverwaltung stehenden Eisenbahnen im Jahre 1894, page 10. Dresden, 1895.

AVERAGE RECEIPTS PER PASSENGER MILE ON THE FRENCH RAILWAYS D'INTÉRÊT GENERAL (NOT INCLUDING THE DUTY).

Year.	Receipts, per Passenger, per mile, in Cents.	Year.	Receipts, per Passenger, per mile, in Cents.
1855	1.84	1870	1.54
1856	1.79	1871	1.51
1857	1.85	1872	1.65
1858	1.82	1873	1.65
1859	1.60	1874	1.65
1860	1.75	1875	1.62
1861	1.74	1876	1.61
1862	1.74	1877	1.62
1863	1.75	1878	1.61
1864	1.74	1879	1.61
1865	1.72	1880	1.57
1866	1.71	1881	1.55
1867	1.64	1882	1.51
1868	1.68	1883	1.48
1869	1.65	1884	1.47

CHAPTER XIV.

The Taxation of Passenger Traffic.

The taxation of the passenger traffic of railroads has developed from the taxation levied upon the stage-coaches during the era before the advent of railroads. The idea of taxing the transportation of persons is by no means new. As early as 1666,[1] a 25 per cent tax was added in Holland to the price of conveyance in the coaches, and other countries soon adopted a similar fiscal policy. The duty once laid upon coaches was soon transferred to the new instrument of transportation, the railway.

This development was evident in the French legislation. By the law of September 30, 1797, a tax (*l'impôt sur les voitures publiques*) was laid upon stage-coach travel, a part of which consisted in a payment of 10 per cent of the cost of the ticket. This law was amended in 1804 and 1817. The law was deemed to apply to steam railways, on the ground that the railway performed the functions of the public carriages, and it was declared by the appellate court (August 1, 1833) that the tax was one upon the transportation of persons, whatever the character or ownership of the roadway used. As part of the passenger receipts were, on the analogy of the common road, attributed to tolls and part to fare (a transportation charge), the railroad claimed the right of paying the tax solely upon the part of the fare which was not toll (or payment for the use of the road), and by the law of 1838, this demand was assented to and the 10 per cent tax was levied upon one-third only of the total fare collected from the passenger.

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[1] Sonnenschein (Sigmund). Die Eisenbahn Transportsteuer und ihre Stellung im Staatshaushalte. Berlin, 1897, p. 13. Frequent use of this excellent work has been made in preparing the present chapter.

The fiscal demands of the government, however, soon led to an increase in the rate of taxation. According to the law of 1838 the tax amounted to only 3 1-3 per cent (or 10 per cent upon 1-3), but after the Crimean war it was increased, by the law of July 14, 1855, to 10 per cent, which was added to the fare, and at the conclusion of the disastrous Prussian war, a supplementary tax of 12 per cent was levied upon the increased fare, the total tax thus amounting to 23.2 per cent (10 per cent of 100 per cent + 12 per cent of 110 per cent.)

This tax amounted to a very considerable increase in the passenger's fare, and led to a decrease in the amount of travel. But the tax (which also included a charge on the express traffic) brought in a large revenue, as may be seen from the accompanying table,[1] and it was not until 1892 that the supplementary tax was removed, and then only on the condition that the railways make considerable reductions in the fares which they themselves received.[2] The result of the removal of the supplementary tax and the reduction of the fare obtained by the railway itself, caused a great increase of the traffic, which has been considered elsewhere.

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[1] RECEIPTS FROM THE PASSENGER DUTY IN FRANCE.

Year.	Millions of Dollars.	Year.	Millions of Dollars.
1841	0.07	1884	16.7
1850	0.4	1885	16.7
1860	4.0	1886	17.0
1870	6.6	1887	. .
1880	15.7	1888	16.1
1881	16.9	[3]1889	19.4
1882	17.2	1890	18.0
1883	17.4	1891	19.4

In 1830 the tax upon the public carriages, from which the railway tax took its rise, netted only $66,000 or about 1-300 of the receipts for 1891.

[2] Colson, C. Les Chemins de fer et le budget, Paris. 1896.

[3] Paris Exposition.

The policy of the French government has been followed by other countries. The Italian law of April 6, 1862 (*Legge colla quale è stabilita una tassa del 10 per cent sul prezzo dei trasporti a grande velocita sulle strade ferrate*), as its title shows, levied a tax of 10 per cent upon the passenger and express traffic, which, by the law of 1874, was increased to 13 per cent, a tax of 2 per cent being at the same time laid upon the freight traffic. A tax of a little less than one cent (five centimes) is also levied upon every railroad ticket issued. The receipts from the tax upon the passenger receipts (exclusive of those from passengers carried on local trains) amounted to 12,773,537 lire, or about $2,465,000, of which over seven-eighths were collected on the great Adriatic and Mediterranean systems. The number of tickets issued was 38,355,981, and the receipt from the stamp duty upon them therefore was a little less than 380,000.

In Russia, the law of December 30, 1878, levied a duty of 25 per cent upon passengers in the first and second class (including express trains), and of 15 per cent in the third class, together with a tax of 25 per cent upon baggage and express traffic, but this was superseded in May, 1894,[1] by a uniform duty of 15 per cent. The receipts from this tax amounted, in 1894, to 9,677,489 roubles.

The Hungarian law of May 6, 1875, laid a tax of 10 per cent upon passengers and baggage; 5 per cent upon express, and 2 per cent upon freight receipts; the law of 1880 raised the passenger duty to 15 per cent, and the freight to 3 per cent, and in 1887 the tax was further increased to 15 per cent upon passengers and baggage, 7 per cent for express and 5 per cent for freight business. For the year 1897, the budget placed the receipts from this tax at 5.76 millions of guldens, or about $2,300,000.

In Austria, the idea of a duty upon the passenger traffic was not pressed until 1892, when the reduction in fares had caused a decline in the revenue of the state railways. It was then proposed to increase the receipts of the government by a duty of 10 per cent upon passengers and baggage. In consequence of the opposition to such a measure, however, the government refrained from levying the tax, but obtained the same and even a greater effect by a radical increase in the rates and fares.

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[1] Sonnenschein, p. 64.

The first act imposing a passenger duty upon British railways was passed in 1832. By this act, 2 & 3 Will. IV., c. 120, it was provided "that the Proprietor or Company of Proprietors of every Railway in Great Britain along which any Passenger shall be conveyed for Hire in or upon any Carriage drawn or impelled by the Power of Steam," should render accounts of the number of passengers conveyed, and pay the duty charged thereon. This duty amounted to one half-penny a mile for every four passengers carried, or in other words, to one-quarter of a cent per passenger per mile, but this was superseded in 1842 (5 and 6 Vict., c. 79) by a general tax of 5 per cent upon the whole passenger revenue.

Two years later, in 1844, a part of the passenger revenue was exempted from this duty. By the Cheap Trains Act (7 and 8 Vict., c. 85) passed in that year, all railways, which were to be incorporated in the future or to receive an extension or amendment of their powers were, with certain exceptions, to run at least one train each way "on every week-day, except Christmas Day and Good Friday," for the conveyance of third-class passengers.[1] There was a number of conditions attached to the running of these trains; the fares were to be no greater than a penny a mile; the speed no less than twelve miles an hour (including stoppages); children under three years were to travel free, and from three to twelve at half fare; fifty-six pounds of free baggage were to be given; seats were to be provided; the hours of starting were to be subject to a

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[1] See Development of Passenger Traffic in Great Britain in a former chapter.

Government Department (the Board of Trade), and the train was required to take up and set down passengers at every passenger station which it should pass. Upon traffic carried under the provisions of this act, no passenger duty was to be levied, and the Board of Trade was permitted to dispense with any of the conditions above described (except that relating to the amount of the fare), in consideration of other and equal concessions being made by the companies.

The extension of the Parliamentary trains under this act, led to a wide exemption, but it was soon discovered that the exigencies of the traffic demanded dispensing with the condition that the trains were to stop at every station. The Board of Trade, acting in good faith, dispensed with the condition during the period from 1844 to 1867, and extended the exemption to all fares not over a penny per mile, although some of this traffic was not carried in third-class carriages. In 1866, the Board of Trade were informed that they had exceeded their power, and, after a long correspondence between that body and the Inland Revenue, a test case was brought before the courts, and it was decided, in 1874, by the Court of Exchequer, and in 1876 by the House of Lords, that the exemption could not be made under the act.

The result of these decisions was a large increase in the amount of the passenger duty, amounting to 20 per cent for the whole of Great Britain, and to 80 per cent in the case of the North London Company.[1] The withdrawal of the exemption caused a great deal of dissatisfaction. Some of the companies increased their fares, others could not resort to this owing to the stress of competition, or to statutory limitations, while still others represented that they merely refrained from compensating themselves at the expense of the passengers, owing to their hope that the act would soon be amended.

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[1] Report from the Select Committee on Railway Passenger Duty, etc. 1876. 312. Appendix No. 5, p. 263.

In consequence of this feeling, a Select Committee was appointed, which came to the conclusion that the tax was an undesirable one to maintain any longer than was necessary from a fiscal point of view, and they further recommended, that until it could be repealed, the tax of 5 per cent should be restricted to fares over a penny a mile, and all fares, whether single trip, return, weekly or season tickets, whether first, second or third class, should be exempted if the fare is less than a penny per mile.[1] The committee further recommended the exemption, in urban and suburban districts, of all fares of all classes not over nine pence, as well as for return fares based upon the fare of the single journey.

In the amendment to the Law of 1844, as finally passed in 1883, under the name of the Cheap Trains Act, 1883 (46 and 47 Vict., Ch. 34), the recommendations of the committee were partially carried out, and the passenger duty was abolished for all single-trip fares not exceeding a penny a mile, and for all return or periodical tickets, when the corresponding single fare is less than a penny a mile, while urban fares exceeding that rate were to be taxed at the rate of only 2 per cent instead of 5 per cent.

In Great Britain, the railway tax on passenger receipts was primarily intended to put steam conveyance and conveyance by horse coaches upon something like an equal footing, and in defending the proposed tax in 1832, Mr. Spring-Rice admitted that "the public would gain more by the repeal of the duty on coaches than by the imposition of a new tax upon railways."[2] But, "as we do lay a tax upon locomotion, it would be a manifest injustice if a coach and horses running upon a road were to be taxed, while a steam carriage running on a railway parallel to that road should not be taxed at all."

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[1] Report from the Select Committee on Railway Passenger Duty, etc. 1876. 312. Appendix No. 5, p. 263.

[2] Rep. 76, p. 6, August 9.

But while the passenger duty upon railways rapidly increased, that upon stage coaches was reduced, the mileage duty on stage coaches being reduced to one penny in 1855, to one farthing in 1860, and altogether abolished in 1870. The following table[1] shows the comparative payments made by railways and stage coaches from 1832 to 1875:

Year.	Amount of Tax Received	
	From Railways.	From Stage Coaches.
1832	£634	£414,075
1835	8,693	509,846
1840	112,427	342,593
1845	190,195	253,668
1850	250,996	211,247
1855	314,825	184,259
1860	359,022	138,978
1865	444,787	138,984
1870	505,907	33,927
1875	627,146	. . .

From 1832 to 1875 the following sums were paid in taxes by

Railways	£12,218,653
Stage coaches	9,188,607
Hackney coaches (London)	2,858,809
Post horses and carriages (G. B.)	5,212,384
	£29,478,453

According to Sonnenschein,[2] the receipts from the English tax on the passenger traffic have been as follows:

Year.	Receipts.
1836	£ 10,000
1840	112,000
1845	315,000
1865	445,000
1883	810,000
1884	392,000
1885	357,000
1886	311,648
1887	324,461
1888	324,117
1889	324,983
1894	257,739

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[1] Rep. 76, Appendix, No. 8, p. 269.

[2] Die Eisenbahn-Transportsteuer, p. 57. The figures for 1845 do not appear to be correct.

Thus the receipts from the tax were only about $4,000,000 in 1883, and about $1,200,000 in 1894 (as compared with a receipt of about $20,000,000 in France in 1891). From this we can see that the tax in England is not primarily a fiscal expedient and that it bears lightly upon the road, the tax for 1894 amounting to considerably less than 1-10 of 1 per cent of the passenger receipts of English railways alone.

The historical summary just given shows to what an extent legislators have hit upon the passenger traffic of railways as a suitable object of taxation. The reasons for this are obvious. The passenger receipts of a railroad are a factor which are easily determined, and the amount of which cannot easily be misrepresented. Secondly, there seems still to be an idea that traveling by rail is to be considered as a luxury, and as such and as an article of direct consumption, to be particularly liable to taxation. Finally, the prevalence of this tax at present may be attributed to the fact that in earlier times the luxury of traveling by coach was subject to taxation, and that the present duty represents merely an historical continuation of the old coach tax. On the other hand, there exists, and has always existed, a strong prejudice against taxes "in restraint of trade," and the interests opposed to high freight rates have been strong enough to prevent the levying of high taxes on freight traffic.

For the United States, a tax upon passenger receipts would be far less advisable than a tax upon total gross receipts. In order to bring in an equal amount of revenue, it would have to be almost five times as high a rate as that upon gross receipts and it would fall unequally upon the different roads and upon the different sections of the country. Thus, if we consider the various groups of the United States, according to the division of the Inter-State Commerce Commission Report, we find that for 1896, Group I (New England), obtained 40.61 per cent of its total earnings from the passenger traffic;

Group X, 26.64; Group II, 22.71; Group V, 22.55; Group III, 22.16; Group IV, 21.89; Group IX, 20.61; Group VI, 20.11; Group VIII, 19.80, and Group VII, 18.02 per cent.[1] A tax upon passenger receipts would thus fall twice as heavily upon the New England railways as upon those of the rest of the country, and the discrepancy would be still greater if separate roads were considered.

There are, moreover, other drawbacks which affect a tax upon passenger receipts to a greater extent than one upon general revenue. A tax upon passenger receipts, in order to bring in any considerable revenue, must be so high as to put a check upon the development of traveling. It may be open to question, however, just to what extent a tax upon passenger receipts will affect fares and whether the tax will fall upon the railway or the passenger. It cannot be stated, as is often done, that if the fare is fixed at a monopoly price, the tax would be paid by the railroad instead of by the passenger. A monopoly price is one which permits the greatest amount of revenue to be obtained, at which, the margin between the cost and price multiplied by the number of articles or services to be disposed of at that price will give the greatest amount of revenue. A tax, however, which would add to the cost and allow the price to remain the same would reduce this margin. A monopoly price is not the highest price which all consumers will pay, but the highest at which a given number will buy. A tax upon a monopoly article will usually raise the price, and part of it will be paid by the consumer. In the case of the railroad ticket this appears to be the case, that the passenger pays at least a great part of the tax and that the taxation results in a considerably decreased travel.

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[1] These figures do not include under "total earnings," those derived from sources other than "operation." See Interstate Commerce Commission Reports for the geographical boundaries of these groups.

CHAPTER XV.

THE LEGAL RELATION OF CARRIER TO PASSENGER.[1]

It is manifestly impossible, within the limits of a short chapter, to treat in an exhaustive manner the legal relations between carriers and passengers. Such a work, moreover, would be supererogatory, as the subject has already been ably and comprehensively discussed in a number of text books. In the present chapter I shall, therefore, limit myself to the statement of a few of the more important facts concerning the legal status of passengers without endeavoring to enter into the details of law and practice, which more properly belong to the province of a legal digest.

Railroad companies, in so far as they do not operate lines for their exclusive and private use, are public carriers of passengers, and in incorporating under a general law, or accepting a special charter, are placed under an implied obligation to serve the public by carrying passengers. It is not the duty of the railroad company to carry passengers on all trains, and it may specify such trains as may be used by passengers, but a legal obligation then exists to carry passengers on the trains so designated.

The railroad company is thus not permitted to refuse to carry passengers, but must, in consideration of the rights and privileges granted to it by the state, carry all passengers who rightfully present themselves and request transportation. In cases of extraordinary press of business, however, where the carrier is disabled from conducting the passenger business, such service may be refused. A railroad company may also refuse to carry a passenger who will not comply with its reasonable rules and regulations, or a person who has a loathsome and contagious disease, who goes upon its train for the purpose of committing a crime or fleeing from justice, who is intoxicated to such an extent as to put other passengers to substantial annoyance, or whose presence on the train will probably lead to mob violence and destruction to its property; and it has been affirmed in one case that a railway is not compelled to carry any person who, by reason of his mental or physical condition, is unable to care for himself and who is unaccompanied by an attendant.

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[1] In writing this chapter I have borrowed extensively from Elliott "On Railroads," and have, in many cases, abridged, paraphrased or copied sentences and parts of sentences.

Generally speaking, there is a legal presumption that every one on the passenger trains of a railroad company, and there for the purpose of carriage with the consent, express or implied, of the company, is a passenger, although this presumption may be rebutted. Persons who pay a consideration for passage, as well as those who ride on passes, are generally considered as passengers, although the relation of passenger and carrier, in so far as it implies that high degree of care which the law prescribes, may perhaps not be considered to exist before the prospective passenger enters the station, waiting room, or the place provided for his reception. The decisions on what constitutes this relation seem to be in the direction of extending rather than limiting the liability of the carrier. Persons who enter trains without permission or knowledge of the railroad company, or through a fraudulent and collusive arrangement with railroad employes, or who ride upon an engine in violation of the rules of the company, are merely trespassers and not passengers.

There is a wide and well-marked distinction between the liability of railroads as a carrier of freight and as a carrier of persons. It is not, *per se*, an insurer of the safety of persons, and where there is no negligence there is no liability on its part. Thus, in accidents, where human fault does not contribute, as where a passenger is injured by extraordinary floods, tempests, storms or the like, there is no liability on the part of the railroad company, provided due care has been exercised in maintaining its roadbed or track and in operating its line. The general rule is, that a very high degree of care is required of railroad carriers in regard to roadbed, tracks, cars, equipments and appliances, and that slight negligence is such a breach of duty as will confer upon a passenger who is free from contributory negligence, a cause of action. This obligation on the part of the railroad company extends to the equipment of its trains with the most modern and improved appliances, to the utmost care in the operation of its trains, to the exercise of a high degree of care in protecting passengers from injury by third persons, and to the construction and operation of stations with reference to the safety of passengers. The care required in stations is not as great as that which the railroad company is obliged to exert while the passenger is on the train; but the obligation remains after the passenger has alighted and during a reasonable time in which he may leave the station.

Railroad companies are not permitted to exact unreasonable compensation for the carriage of persons, but it has been stated that, unless prohibited by statute, there seems to be no good reason why a railway company may not for special reasons sell certain persons tickets at a less rate. Within its terminal limits a state may regulate the rates of fares, in so far as this right has not been relinquished, and in so far as it does not amount to a confiscation of property. Passenger traffic between several states is subject only to the regulation of the Federal government.

According to the generally accepted doctrine, a ticket in the ordinary form is a voucher, token or receipt rather than a contract. It is evidence of a contract rather than a contract itself, and it has been held that representations made by the agents as to stop-over privileges, and the like, may be admitted as evidence of the terms of the contract. A railroad ticket is not negotiable as commercial paper, although it may be transferable unless otherwise provided. As a general rule, a person who buys a direct ticket is bound to pursue the usual and direct course over the company's road, and he is not entitled to stop over unless granted that privilege. Nor does the issuance of a ticket between two places necessarily imply that all passenger trains will stop at both places.

In the case of through tickets over the lines of several companies, the rule is, that the rights of the passenger and the duties and responsibilities of the several companies are substantially the same as though the ticket had been purchased at the office of each of the companies separately, unless there is something in the contract making the first company responsible beyond its own line. In consequence a passenger may stop off at a junction between the connecting lines for any length of time within the life of the ticket.

The courts have upheld the right of a railroad company to limit the time within which a ticket over its road shall be good, but such limitation must not be unreasonable. Where there is no such limitation, a round-trip excursion ticket is good until used, and, in the absence of restrictions for its transfer, may be used by two different persons. A railroad is not obliged to issue commutation or mileage tickets, in the absence of statutory provisions to that effect; but, if issued, they may not be refused to any person desiring to purchase such tickets. The railroad company is permitted to make reasonable limitations to the validity of excursion and commutation tickets in consideration of the reduction in the fares charged.

The most fruitful source of legal proceedings between passengers and railroad companies is to be found in the negligence on the part of the railroad companies and the subsequent claims for damages for injuries received by passengers. Upon this subject a great body of decisions has grown up, but it will be possible here to give only the baldest outline of the law as it exists to-day. Generally speaking, the railroad companies are liable for injuries occurring to passengers while under their care, unless such injuries result from the act of God, or are traceable to contributory negligence on the part of the passenger. The exact determination of what constitutes negligence on the part of the railroad company or contributory negligence upon the part of the passenger, however, is a question which becomes extremely involved in many of the cases which continually arise under railroad management.

The railroad company is obliged to give its passengers a reasonable time for boarding or leaving the train, at the stations, and it is negligence for the conductor to start when a passenger is actually boarding a train. The passenger must exercise reasonable and ordinary care in boarding or alighting, however, and it is *per se* contributory negligence to get on or off a rapidly-moving train. Where a railroad carries passengers on freight or mixed trains it must exercise the same high degree of care for the safety of its passengers as where the transportation is in ordinary passenger cars, although, from the nature of things, the precautions will not be identical in both cases. A passenger riding on the lower step or upon the platform of a rapidly-moving car, under ordinary circumstances is guilty of contributory negligence, although there are exceptional cases where it would not be negligence. In general, a passenger will be guilty of contributory negligence by riding in dangerous or improper places.

Generally speaking, a railroad company may eject all persons who, having a reasonable opportunity, fail to comply with its reasonable regulations, or whose presence, because of their misconduct, or their having a contagious disease, or the like, is the cause of danger or great inconvenience to other passengers. Such ejection, however, does not permit the use of excessive and unnecessary force, and if a passenger is ejected while the car is in motion, or in a dangerous and improper place, and is thus exposed to unnecessary peril, the railroad company is liable. Railroad companies are also liable for injuries to passengers caused by the negligent acts of their employes, as well as for injuries wilfully inflicted upon passengers by their employes within the scope or line of their duty while engaged in executing the contract of carriage. To a less extent, they are also liable for injuries to passengers by third persons and other passengers, and are obliged to use proper care and diligence to protect them from such injuries by such persons that might reasonably have been foreseen and anticipated. It is also the duty of the railroad company to keep its stations, platforms and approaches in such a condition that passengers who have occasion to use them can do so in safety, and it is liable for any neglect of such reasonable care and precaution.

In actions for damages, brought by injured passengers against a railroad company, the burden of proving all the material facts naturally rests on the plaintiff, but negligence may often be inferred from circumstances and proof of the accident and injury, thus constituting a presumption of negligence on the part of the company. The liability of the company cannot be abridged or limited where the company is under a duty to carry and it undertakes to carry for hire or reward, although it has been held that where the service is purely gratuitous, a contract exempting the railroad company from such liability may be valid, although there are cases that may be cited to show the invalidity of such a contract.

CHAPTER XVI.

THE PROBABLE FUTURE OF THE PASSENGER TRAFFIC.

It is manifestly impossible to advocate like policies for different countries or for different railway systems, and I shall therefore confine my attention chiefly to the results obtained in so far as they may be applied to a few countries with state railways and with a well-developed railway net. It may be seen that there exist in all countries great possibilities for developing passenger traffic. The amount of travel although very large, compared to the movement of even thirty years ago, is quite susceptible of further increase. It is also apparent that any such increase is directly in the line of national and industrial progress. It is not necessary to discuss here the advantages or disadvantages of this industrial progress, or to treat the question of whether the evils arising from improved means of production and transportation are greater than the advantages accruing therefrom, since this process must inevitably go on. There is no better way of aiding it however than by stimulating travel and by increasing the mobility of the population. It is therefore advisable to increase the passenger traffic, even, if necessary, at some expense to the state revenues.

In a former part of this book, it has been suggested that the proper principle in the determination of fares is not that of a just division according to the cost to the railway of each kind of travel nor according to the value of the travel to the persons conveyed, but that of the adoption of a policy which will increase socially advantageous travel without proportionately increasing its cost. This policy finally resolves itself into two distinct objects. It must be attempted to stimulate that traffic, which most completely responds to stimulation, which, in other words, has the greatest elasticity of demand. It must also be sought to secure that sort of traffic, and to make such traffic arrangements as to decrease as far as possible the per capita cost of traffic, in other words to secure the best possible exploitation.

As to the first point it has been shown that it is the cheaper forms of traffic that are the most susceptible to price variations, and that can best be stimulated. The number of trips taken will be measured by the number of times that the anticipated pleasure and profit from a trip will be greater than the expected cost. Whereas a few trips are so necessary that they will be taken at almost any price, the greater majority of them present but a comparatively small excess of advantage over cost, whereas there is probably an infinitely greater number of possible journeys in which the present cost is but slightly superior to the pleasure to be obtained.

The greater susceptibility of the cheaper forms of travel to price variations, is shown in the manner in which the increasing traffic has taken advantage of the slightest diminutions of price, even when accompanied by far worse accommodations. The policy of decreasing the price of railway travel should, therefore, be undoubtedly continued in countries where there is government ownership. The German fourth-class traveler pays two-thirds of one cent per mile traveled, and the railways make a considerable profit from this class. If the rates for all fourth-class trips on German railways were reduced to one-half cent or even less per mile (with a minimum charge of five cents per trip), the railways could in all probability make some profit while at the same time affording decent accommodations. Whether the reduction in fares should be proportional to the distance depends upon the principle adopted in the regulation of other fares.

The theory of passenger fares that is most opposed to the present practice is that of the so-called Zone-tariff, which is still attracting considerable attention in Europe. This theory which was advanced by an Englishman, a Dane and a German[1] almost simultaneously about thirty years ago, and has been since advocated principally by Dr. Hertzka of Vienna and Dr. Engel of Berlin is based on the principle that railway fares should be independent of the distance traveled. The value of the trip to the passenger is not proportional to the distance traveled, nor do the costs to the railway increase proportionately to an increase in the length of the journey. It is further maintained that with cheaper fares for long distances, the use of the cars would be far more complete and that the railway in consequence could greatly reduce the fares.

The advocates of this theory hold that there should be but two or three different rates of fare charged for a journey, whatever its length; that the whole distance that can be traveled should be divided into a few zones or circles (with the point of departure as the centre, thus not geographical zones) and that the fare should increase not with each mile but with each new zone.[2] To take the scheme of Engel as a single instance. The fares he proposed for Germany are:

Zones. Miles.	First Class. Cents.	Second Class. Cents.	Third Class. Cents.
0—31	48	12	6
31—62	96	24	12
62—800[3]	192	48	24

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[1] Brandon, Scharling, Perrot.

[2] As has been repeatedly pointed out, there is no logical difference between making the fare increase with every new mile or with every new zone (or stretch of 50 or 100 miles). This feature, and in the Austrian tariff this is the only feature, is principally to be recommended on account of greater simplicity and to be condemned for occasional discrimination against places, but the most important characteristic of the zone-tariff as it exists in actual practice is that it is an expedient for reducing the fare on long distances.

[3] Sixty-two miles to any distance from one part of the German empire to another.

This would reduce the fare per mile for a trip third class of 800 miles to about one-thirtieth of a cent per mile. Measured by distances in our own country it would cost no more to travel from Philadelphia to Chicago or Portland, Maine, than to New York or Baltimore.

The question of zone-tariff versus mileage tariff is usually confused with another problem that of cheap versus dear fares. The zone-tariffs that have been hitherto proposed, and adopted, have had their chief recommendation in the fact that they were very cheap. But the cheapness of fares and the principle of the zone-system are not necessarily connected and the question should resolve itself into one of whether the near or the far traffic should be most stimulated. Experience has shown that the local traffic has always responded more fully and rapidly to a diminution in the fare than has the long distance traffic; and it is therefore here that the greatest reductions should be made.

The defenders of the zone-tariff would, as a rule, overburden the local traffic for the sake of the distant trips, but in this respect the Hungarian zone-tariff departs from the rule by favoring local traffic and with exceptionally favorable results.

It should therefore be the aim of the rate-maker to stimulate the local traffic by all means in his power; but the very distant traffic might also demand more favorable rates per mile. If in Germany the average journey is less than twenty miles, it would pay to have a falling scale of charge for all distances over fifty or at least over one hundred miles. In this respect the Hungarian tariff has also been quite successful and a considerable number of additional long trips has been taken, although even the greatly decreased charges could not produce a very intense traffic.

The establishment of low rates for passenger travel would do away with the necessity of the great series of special rates, which now prevail. It is wrong to consider these special reductions on return tickets, mileage tickets, etc., as arbitrary and founded on no deeper principle than the whim of passenger agents. A study of these reductions will show that apart from certain philanthropic or social aims pursued by the railway administrations, there has been ever present with them a desire to give special advantages to those forms of travel that were most likely to be influenced by such a diminution in the fare. Thus there might seem no reason why less should be paid for a return ticket than for the two separate trips of which it is composed, and while competing lines might make concessions in order to get the return traffic, it would seem a questionable policy on the part of railways which have no competitors. This policy, however, has been generally introduced and has proven successful.[1] Its *raison d'être* is to be found in the fact that on return trips, where the traveler does not remain long in the place he visits, the price of the ticket is a large factor in the total cost, and this traffic is especially liable to stimulation. The same may be said of tickets to seaside resorts and above all of excursion tickets although here the use of the rolling stock and motive power is greatly improved by the conditions of travel. The suburban tickets for working men also reach a class of travelers to whom the cost of the trip is of supreme moment, and whereas in London there are special workingmen's trains run at long intervals (upon which alone the tickets sold are valid) the use of the cars is so favorable that exceedingly low fares may be charged without imperiling the railway revenues. The special rates for suburban trips may also be attributed to this greater elasticity of the demand for travel.

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[1] Thus in France where the traffic is monopolized by the great companies, each of which has its own territory, the number of passengers traveling at reduced rates (*à prix réduit*) has rapidly increased and now exceeds the number of travelers paying full fare. In other countries similar phenomena are observable.

The effect of these special rates is greatly to stimulate that traffic that will best answer to stimulation, but they are but happy exceptions to a pernicious rule. It may be said that in all, or nearly all countries, the tendency has been to keep the general level of passenger fares as high as possible. The railways have had to compete with water communication, with canals and rivers for the carrying of goods, and freight charges have come down accordingly. But until recently the railways have not been obliged to compete for the passenger business, and the result has been somewhat similar to that of the postal policy before the reform of Rowland Hill. The railways have not taken the initiative in reducing fares, and in consequence while the traffic has increased to a great extent, it has by no means attained the proportions possible under a more liberal management of the roads.

In consequence of the policy thus adopted general traveling is considered in many countries as something of a luxury, and it is only the exceptional and cheaper forms of traveling that are used by the public to any extent. It is, however, neither to the interest of the railroads nor to that of the public to limit traveling to that which is absolutely necessary, since so many of the possible economic satisfactions are intimately bound up with a change of place.

If the general rates for passenger traffic were very low, and those for distant trips brought them within reach of the average man, there would be no necessity for the complicated system of reduced rates which finds its present justification in the dearness of ordinary traveling. Special tickets of all kinds could be done away with, and the tickets could be sold in the simple fashion that postage stamps are now offered for sale. The lowness of the fare would do away with the necessity of special reductions for any cause whatsoever.

The tendency of passenger traffic to increase more than proportionately with diminutions in fare, and the possibility of decreasing the cost per traveler by an increase in their number render it possible to reduce the present fares very materially without loss to the railways, and in countries where the roads are owned by the state, it would very well pay to suffer moderate losses rather than stunt the growth of the traffic. But in the arrangement of the traffic, it would be absolutely necessary to reduce the costs as far as possible.

This cannot be done to any great degree, however, at the cost of safety. The moral sense of the community will not permit the railways to measure loss of life against a moderate loss of income to the railways. All questions of this nature are essentially indefinite and incapable of precise and absolute statement. How far the safety of travelers should be considered at the cost of additional expense of construction and exploitation does not really admit of a definite answer. If the Prussian railways could by improved methods decrease the number of fatal accidents at the cost of a million dollars per individual, such expensive means of safety would probably find no advocates. If on the other hand the railway could diminish the number of lives annually lost by additional expenditures amounting to one thousand dollars per individual saved from fatal accident, the railways would be forced to adopt them, and even without such pressure it would be to their very evident advantage to do so. The nearest approach to the value which the community puts upon the lives of its members is shown in the indemnity that the railways must pay for fatal accidents, and, as awards for injuries increase or decrease, the railway will incur more or less expense for the avoidance of such fatalities. Luckily this sum is increasing and steam railway accidents are diminishing in proportion to the traffic.

This diminution in the number of fatal accidents will in all probability continue. The community is awakening to a realization of the necessity of protecting the lives of its citizens, and the railways have everywhere adopted expensive systems in order to avoid future accidents.[1]

As regards comfort, it might be shown that the ordinary comfort does not involve considerable cost. If the railways were run at very low fares, the travelers of the lower class would be satisfied with accommodations little superior to those afforded by the average street cars of to-day. The chief cost of comfort arises from the increased room that is necessary. It is this which makes the first and second-class travel so expensive on the continent of Europe as well as the fact that the seats are not filled. In the cheaper forms of travel the attempt should be made to fill as many seats as possible, and in local and suburban traffic the cars might be occasionally used even beyond their seating capacity.

The number of classes should be sufficient to reach all the lucrative traffic, but should not be large enough to make the expenses of exploitation excessive. The present tendency in Europe appears to be to decrease the number of classes, and this policy is not without its justification. The third and fourth-class carriages are becoming somewhat more similar in comfort, and between the first and second-class compartment there is very little difference. In America the great mass of our travelers ride in what we call first-class compartments, and we have felt less the necessity of minute subdivision into classes because the high fares generally prevailing on steam railroads have shut out great masses of the population from most kinds of railway travel. Yet even in America we have besides the so-called second-class and occasional emigrant traffic, two distinct classes of cars, the parlor cars and the so-called first class. The most advantageous division appears to be one of two classes, one of which will be very cheap and absorb from 70 to 90 per cent of the traffic, and the other a higher class to provide for those travelers who demand more comfort or greater seclusion. On certain lines an intermediate class might be run instead of the first-class cars.

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[1] Some conception of the frequency of accidents may be obtained by considering the English and German statistics. Despite the immense increase in the traffic, the number of accidents increased only from 3,504 to 3,618, or less than 3 per cent during the fourteen years ending in 1894–95, while in England during the same time the number of accidents *decreased* over 60 per cent, being 3,076 in 1881–82 and only 1,240 in 1894–95. In Germany there were but 8 travelers killed per 100,000,000 carried in 1894–95 compared to 12 during the last fourteen years, and but 43 persons injured compared to 61 during the whole period. In England the number of travelers killed decreased during the last fourteen years from 23 to 13 per 100,000,000, and those injured from 290 to 141. The proportion of railway employes killed has also diminished in both England and Germany, while in the United States the improvement during the last six or seven years has been remarkable. It should be observed here, however, that while it is perfectly admissible to compare the accidents in one country at a certain time with the number of accidents at a former time (as has been done) it is quite inadmissible to compare the number of accidents in different countries, owing to differences in the method of keeping statistics.

Speed is an element of cost, and it would be expensive to run the ordinary trains at a very high velocity. The point at which the cheaper traffic is run should be higher than that of the continental accommodation trains, but might be slower than that of English or American express trains. The low rate of speed at which many trains in Europe are run is uneconomical, often involving an absolute increase in cost.

The change in the movement of passengers here contemplated would involve a far greater mobility on the part of the population, and a largely increased passenger traffic of railways. There seems little doubt that this change is possible, and in thickly populated districts the traffic might increase several fold. In countries where the ownership of railways rests with the community, such an extension of traffic is not only feasible, but would act as a most powerful lever in elevating the population. There is, of course, still a certain prejudice against traveling which would rapidly disappear when traveling was made more common. There are other factors working against traveling besides that of high fares, but these would largely be remedied by any increase in the traffic. A great extension of traffic would enable the establishment of cheap hotels, under the general direction of the railways,[1] and other accommodations might be arranged for at equally low rates.[2] Another factor which formerly acted as a bar to traveling, was the small amount of free time enjoyed by the average individual, but the duration of the working day is experiencing a decrease, and the number of those with considerable spare time is rapidly increasing.

The introduction on many of the railways of the Continent of Europe of combined tickets (which have something in common with our thousand-mile tickets) has demonstrated the amount of traveling which a week's vacation will enable one to make. With our comparatively sparse population and long distances, we cannot visit as many interesting places with a given amount of traveling. If, however, we draw a circle around a place in South Germany, as Munich, for instance, with a radius of 300 miles (a moderate ten-hours' trip), and observe the number of places of interest within the circle, we will obtain some idea of what the incentive to travel would be if fares were very low.

It might be supposed that the desire for a widely-diffused taste for traveling and for an immense traffic at low fares, would remain a pious wish, and that the railways (even when owned by the state) would not now make concessions, withheld or at least but gingerly granted during fifty years. But a new factor has entered into the problem with the introduction of a new and powerful competitor of the steam railroad—the electric railway.

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[1] The railways have gone into this business, though not as yet with the idea of furnishing cheap accommodation. The railways already provide of course also for the refreshment of the travelers.

[2] The cheapness with which such arrangements may be made is shown by the activity of organized bodies of travelers. If the railways of a country organized the whole body of travelers in a similar way, the resulting cheapness would remove a great hindrance to traveling.

The development of the electric railway in America has been quite unprecedented in the history of transportation. The development has been principally on the city streets. In 1887 there were but thirteen lines of electric railway, operating about one hundred cars. In 1898 the number of lines operated by electricity had increased over sixty-fold, the track mileage amounting to 15,672 miles, the number of cars (including trail cars) had increased to 44,343, while the capital represented exceeded the sum of $1,500,000,000. Most of the lines carried passengers alone, but the experience of a few demonstrated the ability of the electric car to carry certain kinds of freight, express and mail matter.

As long as the electric railways were confined to the cities, they did little to affect the interest of the steam railways. A few years ago, however, they branched out largely into suburban and interurban traffic. The importance of this venture will be the more apparent when we consider the advantages possessed by the electric cars over the older competitors.

One of the chief advantages possessed by the electric railways is their comparative cheapness. The capital invested in steam railways (apart from water) represents the imperfect and costly methods of former times and the futile experiments of decades. The steam railways have been obliged to construct expensive lines, to buy their right of way (often at an exorbitant cost) and to fight for their privileges against adverse legislators. The electric railways have all the advantages of modern technical knowledge upon their side, and what is sometimes more important, they have in the majority of cases obtained their right of way at a moderate expense by using the public roads. They have thus been able to charge lower fares, and their ability to exploit the cars better than the railways is another point in their favor. In the electric railways the motive power is furnished from a central station, and the power being divisible the amount of rolling stock needed for each trip can be accurately determined. While the steam engine must haul a minimum number of cars to avoid waste of power, the electric cars can haul just sufficient for their purpose. They can thus run at more frequent intervals, and adapt themselves more easily to the wishes of the travelers.

The lower rates of speed at which they run so long as they keep to the public highway would enable them to obtain a still greater exploitation as the platforms and even the standing room aroused when necessary.[1] The electric railways, therefore, on short-distance traffic could afford to run far more cheaply than the railways—first, because their initial costs would be less, and, secondly, because their exploitation of the cars would be far more complete.

If the fares would be less, the other conditions would also weigh rather on the side of the electric than on that of the steam railways. The frequency of trains can be far greater on the electric railways, as they can run the cars off in small detachments. The traveler would have the advantage of entering on his trip not only *whenever* but also *wherever* he wished, as the city network of lines would enable him by means of exchange tickets to go from any point of one city to any point in another. This absence of delay frequently permits the electric railway to dispense with the construction of expensive stations in the heart of the city and thus still further decreases its expenses.

In point of speed the railways are superior to electric railways upon the public highways, but this is of small moment for short distances.

The electric railways can easily be run at twenty miles an hour[1] and even admitting that on a distance of twenty miles that the express trains will save twenty or twenty-five minutes, it will be equally true that on an average a greater time will be lost in going to and from the central stations, and in waiting for trains. What we may call the terminal waste of time is often as great as the time in which the train is in motion, and thus for short distances the electric railway will have the advantage.

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[1] In 1886 there were thirty-nine passengers per car trip on the Massachusetts street railways, in 1889 there were forty-three, in 1892 forty-seven, and in 1895 there were fifty passengers per trip made by each car.

The comfort to be obtained on the steam railroad is generally greater, but this is of less importance on short trips and it would be perfectly feasible for the electric railways to run occasional parlor cars with more luxurious fittings, just as "smokers" are at present run.[2]

The advantages are of course not entirely upon the side of the electric railway but in many places where the traffic is sufficiently dense and where legislation is not adverse, interurban electric railways have created an enormous and cheap traffic, and the railways themselves have in isolated cases made use of electric motive power and have contemplated the construction of electric lines as feeders to the railway. The incorporation of electrically equipped railways under the general railroad acts, will also probably result in a greater extension of electricity to the passenger traffic, to a decrease in fares and to a more economical handling of a vastly increased traffic.

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[1] The question here is not one of absolute speed, which is as high in the electric railways, but in the rate of speed at which it is safe to operate on the public highway. Where the electric railway is built on a private right of way, and in many states it does so by incorporating under the general steam railroad act, this limitation of speed is obviated.

[2] In one point of comfort, the electric railways have a considerable advantage, and that is in cleanliness. There is neither soot nor ashes, nor smoke, whereas with coal as fuel these cannot be avoided on the ordinary railways. It is also possible to use a cheaper form of labor (motormen) to guide an electric car than to run a locomotive.

APPENDIX OF MISCELLANEOUS STATISTICS[1] UPON RAILWAY PASSENGER TRAFFIC.

PASSENGER STATISTICS OF AMERICAN RAILWAYS.

	Railway mileage.	Passenger Cars.			Passenger Train, mileage.	Passengers Carried.		Passenger Mileage. Total.	Mileage per Passenger Locomotive.
		Number.	Number per 100 miles of line.	Number per 1,000,000 passengers.		Number.	Per Passenger Locomotive.		
Group I	7,749.01	4,250	55	41	32,585,568	104,344,466	98,068	1,879,361,248	1,766,327
Group II	21,114.27	10,033	48	52	87,206,864	193,062,359	69,168	4,008,906,124	1,436,884
Group III	24,051.57	4,441	18	79	55.479,095	56,209,914	37,624	2,044,871,955	1,368,723
Group IV	11,167.27	1,256	11	101	15,026,248	12,462,222	36,018	527,904,641	1,525,736
Group V	20,540.38	2,581	13	117	29,224,385	22,042,650	29,003	973.515,928	1,280,942
Group VI	42,866.56	5,532	13	72	69,903,170	76,939,792	45,962	2,518,070,391	1,504,224
Group VII	10.817.25	832	8	178	9,854,950	4,676,141	20,331	405.437,286	1,762,772
Group VIII	23,243.16	2,121	9	115	27,262,872	18,505,402	23,132	892,526,161	1,115,658
Group IX	11,369.18	900	8	125	11,626,076	7,217,341	22.625	385,564,472	1,208,666
Group X	14,616.03	1,904	13	69	16,247,688	27,716,221	66,466	955,169,407	2,290,574
Total, 1899	189,294.66[2]	33,850	18	65	354,416,916	523,196,508	52,878	14,591,327,613	1,474,765
Total, 1898	186,396.32	33,595	18	67	341.526,769	501,066,681	50,328	13,379,930,004	1,343,906
Total, 1897	184,428.47	33,626	18	69	335,018,605	489,445,198	48,861	12,256,939,647	1,223,614
Total, 1896	182,776.63	33,003	18	64	332,854,218	511,772.737	51,471	13.049,007,233	1,312,381
Total, 1895	180,657.47	33,112	19	65	317,565,615	507,421.362	50,747	12,188,446,271	1,218,967
Total, 1894	178,708.55	33.018	19	53	326,503,219	540,688,199	54,654	14,289,445,893	1,444,400
Total, 1893	176,461.07	. . .	. .	. .	335,618,770	593,560,612	. . .	14,229,101,084	
Total, 1892	171,563.52	. . .	. .	. .	317,538,883	560,958,211	. . .	13,362,898,299	
Total, 1891	168,402.74	. . .	. .	. .	307,927,928	531,183,998	. . .	12,844,243,881	
Total, 1890	163,597.05	. . .	. .	. .	285,575,804	492,430,865	. . .	11,847,785,617	

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[1] The statistics for the United States have been taken from the Statistical "Reports of the Interstate Commerce Commission;" those for Belgium from the official reports "Chemins de fer, etc" and the "Annuaire Statistique;" those of the United Kingdom from the reports of the Board of Trade; those of Germany from various numbers of the "Statistisches Jahrbuch;" those of Italy from the "Annuario Statistico;" those of Japan from the "Resumé Statistique de l'Empire du Japon" (Tokio, 1901, published in Japanese and French); those of Mexico from the "Anuario Estadístico de la República Mexicana;" those of Switzerland from the "Annuaire Statistique de la Suisse," and the others from various government and other publications as reproduced in the excellent and reliable Archiv für Eisenbahnwesen." There are occasional instances of disparity between different data on the same subject which I have not always been able to verify or correct.

[2] Including 1,759.98 miles not reported. For the various groups I to X see Statistical Report of Interstate Commerce Commission.

	Passenger Density.[1]	Average number of Passengers in train.	Average length of Journey. Miles.	Passenger Revenue.[2]	Per Cent of Total Earnings.	Per Cent of Total Earnings and Income.	Per Cent of Total Passenger Earnings to Total Earnings of Operation.[4]
Group I	242,529	58	18.01	$34,253,464	38.67	34.24	45.16
Group II	189,867	46	20.76	71,196,181	22.56	19.28	27.03
Group III	85,020	37	36.38	40,437,836	21,39	19.60	27 23
Group IV	47,272	35	42.36	11,832,193	22.51	21.46	28.32
Group V	47,395	33	44.17	22,071,761	22.01	19.99	27.41
Group VI	58,742	36	32.73	52,002,536	19.45	18.16	24.65
Group VII	37,481	41	86.70	9,151,291	17.64	16.17	24.14
Group VIII	38,460	33	48.23	20,677,384	18,23	17.16	24.05
Group IX	33,913	33	53.42	9,114,068	17.18	16.19	21.90
Group X	65,351	59	34.46	20,376,279	24.90	20.09	30.60
Total, 1899	77,821	41	27.89	291,112,993[3]	22.16	19.91	27.52
Total, 1898	72,462	39	26.70				
Total, 1897	66,874	37	25.04				
Total, 1896	71,705	39	25.90				
Total, 1895	68,572	38	24.02				
Total, 1894	81,333	44	26.43				
Total, 1893	83,809	42	23.97				
Total, 1892	82,285	42	23.82				
Total, 1891	79,642	42	24.18				
Total, 1890	75,751	41	24.06				

[1] Passenger density means the number of times that the whole travel of a railway contains its length; in other words, the number of times a passenger would ride over the entire line if the whole passenger traffic were performed by him alone. Statistically it is arrived at by dividing the passenger mileage by the length of the railway.

[2] Not including mail, express or miscellaneous passenger revenues.

[3] 187,534.68 miles of line represented.

[4] Includes mail, express and miscellaneous passenger revenues.

PASSENGER STATISTICS OF AMERICAN RAILWAYS.

Year.	Revenue per Passenger Mile. Cents.	Revenue per Ton Mile. Cents.	Rev. per Ton Mile in per cent of Revenue per Passenger Mile. Per Cent.	Revenue per Passenger Train Mile. Cents.	Revenue per Freight Train Mile. Cents.	Revenue per Passenger in Per Cent of Freight Train Mile. Per Cent.	Average Cost of Running a Train (All Trains.) Cents.
1890 . .	2.167	.941	43	108.64	165.43	66	96.01
1891 . .	2.142	.895	42	106.11	163.68	65	95.71
1892 . .	2.126	.898	42	106.87	164.61	65	96.58
1893 . .	2.108	.878	42	106.82	162.72	66	97.27
1894 . .	1.986	.860	43	104.90	155.74	68	93.48
1895 . .	2.040	.839	41	97.87	161.19	61	91.83
1896 . .	2.019	.806	40	98.59	163.34	60	93.84
1897	2.022	.798	39	93.92	165.36	57	92.92
1898 . .	1.973	.753	38	97.42	173.11	59	95.64
1899 . .	1.925	.724	38	101.62	179.04	57	98.39

PASSENGER STATISTICS OF AUSTRALIAN RAILWAYS.

	New South Wales.		Victoria.		Queensland.	
	1897–98.	1898–99.	1897–98.	1898–99	1897–98.	1898–99
Aver'ge Year's Length Miles	2,659	2,704	3,124	3,122	2,586	2,713
No. of Passengers . .	23,233,206	24,726,067	43,090,749	45,805,043	2,742,108	[1]3,716,425
Passenger Revenue[3] .	£1,126,257	£1,155,971	£1,325,062	£1,372,000	£391,270	£447,123
Passenger Train Miles	4,079,970	4,169,005	. . .	. . .	. . .	. . .
Number of Passenger Cars	1,050	1,044	1,061	1,092	344	371

	South Australia.		New Zealand.[2]		Tasmania.	
	1897–98	1898–99.	1897–98.	1898–99.	1897.	1898.
Aver'ge Year's Length Miles	1,724	1,724	2,044	2,061	432	445
No. of Passengers . .	6,050,189	6,171,081	4,672,264	4,955,553	603,530	617,643
Passenger Revenue .	£291,411	£297,207	£494,302	£541,971	£62,447	£68,319
Number of Passenger Cars	365	372	543	550	177	180

[1] Not including season-ticket holders.

[2] From April 1 to March 31.

[3] £ = $4.866½.

MILEAGE OF AUSTRALIAN RAILWAYS IN VARIOUS PERIODS.

	1861. Miles.	1866. Miles.	1871. Miles.	1876. Miles.	1881. Miles.	1886. Miles.	1891–92. Miles.	1896–97. Miles.
New South Wales	73	143	358	554	1,040	1,941	2,266	2,724
Victoria	114	275	276	718	1,247	1,754	2,903	3,129
Queensland	. .	50	218	298	800	1,433	2,320	2,506
South Australia . .	56	56	133	308	845	1,226	1,823	1,889
West Australia . .	. .	. .	. .	38	92	202	657	1,361
New Zealand . . .	. .	. .	105	718	1,334	1,810	2,011	2,185
Tasmania	. .	. .	45	45	168	303	425	475
Total	243	524	1,135	2,679	5,526	8,669	12,405	14,269

MILEAGE, PASSENGER TRAFFIC, PASSENGER RECEIPTS AND AVERAGE FARE RECEIVED ON AUSTRIAN RAILWAYS, 1861–1897.

Year.	Length of Railway, Kilometers.	Number of Passengers, Kilometers (Millions).	Passenger Receipts.[1]	
			Total Florins (Millions).	Per Passenger, Kilometer, Kreuzers.
1861	5,488	802.5	20.7	2.579
1862	5,749	838.3	22.0	2.624
1863	5,867	855.4	20.5	2.397
1864	5,920	837.3	20.6	2.461
1865	6,094	761.3	18.4	2.418
1866	5,888	1,516.2	23.9	1.576
1867	6,215	749.4	20.7	2.763
1868	6,905	873.5	23.5	2.690
1869	7.904	1,054 6	27.3	2.588
1870	9,202	1,214.2	30.1	2.479
1871	11,764	1,497.6	35.9	2.397
1872	13,722	1,886.9	43.1	2.284
1873	15,559	2,293.9	53.0	2.301
1874	16,333	1,987.4	44.8	2.255
1875	16,770	1,941.3	43.7	2.244
1876	17,473	1,897.9	42.9	2.260
1877	17,466	1,798.2	44.0	2.447
1878 . . .	17,964	1,958.5	43.2	2.190
1879	18,279	1,901.8	42.8	2.234
1880	18,196	1,949.4	44.5	2.266
1881	18,282	2,030.1	46.0	2.244
1882	18,640	2,187.9	48.4	2.159
1883	19,325	2,374.3	50.6	2.103
1884	20,409	2,569.4	53.1	2.040
1885	21,973	2,730.2	55.0	2.015
1886	22,404	2,663.6	53.3	2.004
1887	23,583	2,693.5	54.6	2.027
1888	24,737	2,779.4	56.4	2.030
1889	25,649	3 053.0	60.0	1.965
1890	26,013	3,634.7	63.3	1.740
1891	26,915	4,357.0	65.8	1.510
1892	27,189	4,655.6	66.6	1.435
1893	27,690	5,110.2	70.9	1.388
1894	28,482	5,577.1	77.3	1.386
1895	29,371	5,800.5	81.2	1.400
1896	30.584	5,994.7	86.5	1.441
1897	32,239	6,008.3	87.2	1.450

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[1] Florin equals 40.6 cts. Kreuzer 0.406 cent.

PASSENGER TRAFFIC AND EARNINGS ON BRITISH RAILWAYS (UNITED KINGDOM).

Year.	Number of Passengers.[1]	Passenger Receipts.			Year.	Number of Passengers.	Passenger Receipts.		
		In £.	Per Cent of Increase.	Per Cent of Total Receipts.[2]			In £.[3]	Per Cent of Increase.	Per Cent of Total Receipts.
1854 . .	111,180,165	10,244,954	. .	50.68	1877 . .	549,541,325	26,534,110	1.42	42.13
1855 . .	118,567,170	10,694,790	4.39	49.73	1878 . .	565,024,455	26,889,614	1.34	42.78
1856 . .	129,315,196	11,376,337	6.37	49.11	1879 . .	562,732,890	25,915,585	—3.62	41.95
1857 . .	138,971,240	11,888,219	4.50	49.18	1880 . .	603,885,025	27,200,464	4.96	41.53
1858 . .	139,141,135	11,697,906	—1.60	48.83	1881 . .	623,047,787	27,692,000	1.81	41.26
1859 . .	149,757,294	12,537,493	7.18	48.70	1882 . .	654,838,295	28,796,813	3.99	41.51
1860 . .	163,435,678	13,085,756	4.37	47.13	1883 . .	683,718,137	29,508,733	2.47	41.53
1861 . .	173,721,139	13,326,475	1.84	46.65	1884 . .	694,991,860	30,030,450	1.77	42.58
1862 . .	180,429,071	13,911,985	4.39	47.76	1885 . .	697,213,031	29,773,022	—0.86	42.80
1863 . .	204,635,075	14,521,528	4.38	46.61	1886 . .	725,584,390	30,244,938	1.59	43.46
1864 . .	229,272,165	15,684,040	8.01	46.11	1887 . .	733,678,531	30,573,287	1.09	43.09
1865 . .	251,862,715	16,572,051	5.66	46.17	1888 . .	742,499,164	30,984,090	1.34	42.51
1866 . .	274,293,668	17,395,925	4.97	45.58	1889 . .	775,183,073	32,630,724	5.31	42.36
1867 . .	287,688,113	17,935,634	3.10	45.43	1890 . .	817,744,046	34,327,965	5.20	42.94
1868 . .	. . . .	. . . .	. .	. .	1891 . .	845,463,668	35,130,916	2.34	42.92
1869 . .	312,759,053	18,811,504	4.88	44.06	1892 .	864,435,388	35,662,816	1.51	43.44
1870 . .	336,545,397	19,301,911	2.61	42.82	1893 . .	873,177,052	35,849,449	0.52	44.46
1871 . .	375,220,754	20,622,580	6.84	42.18	1894 . .	911,412,926	36,495,488	1.80	43.29
1872 . .	422,874,822	22,287,555	8.07	41.87	1895 . .	929,770,909	37,361,162	2.37	43.48
1873 . .	455,320,188	23,853,892	7.03	41.31	1896 . .	980,339,433	39,120,865	4.71	43.41
1874 . .	477,840,411	24,893,615	4.36	42.01	1897 . .	1,030,420,201	40,518,064	3.57	43.23
1875 . .	506,975,234	25,714,681	3.30	41.99	1898 . .	1,062,911,116	41,847,074	3.28	43.48
1876 . .	534,494,069	26,163,551	1.75	42.05					

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[1] Not including season tickets.

[2] Only traffic receipts.

[3] £ = $4.866½.

STATISTICS OF PASSENGER TRAFFIC ON BELGIAN STATE RAILWAYS.

Year.	Average Length of Railway. Kilometers.	Passenger Receipts. Francs.[1]	Number of Passengers.	Distance Made by Passenger Trains. Kilometers.	Number of Passengers on Special Tickets.			Average Journey on Special Tickets.		
					Ordinary.	Students.	Workmen.	Ordinary. Kilometers.	Students. Kilometers.	Workmen. Kilometers.
1835 . .	14	268,997	421,439	50,370	. . . .	. . . .	. . . . .	. . .	. . .	. . .
1840 . .	325	4,046,950	2,199,319	655,367	. . . .	. . . .	. . . . .	. . .	. . .	. . .
1845 . .	560	6,393,309	3,470,678	1,512,775	. . . .	. . . .	. . . . .	. . .	. . .	. . .
1850 . .	625	7,312,525	4,188,614	. . . . .	. . . .	. . . .	. . . . .	. . .	. . .	. . .
1855 . .	652	9,755,749	5,288,216	. . . . .	. . . .	. . . .	. . . . .	. . .	. . .	. . .
1860 . .	747	11,305,874	7,412,361	2,830,890	. . . .	. . . .	. . . . .	. . .	. . .	. . .
1865 . .	749	14,589,836	10,677,963	4,614,983	. . . .	. . . .	. . . . .	. . .	. . .	. . .
1870 . .	869	16,139,077	14,134,356	5,177,104	. . . .	. . . .	. . . . .	. . .	. . .	. . .
1871 . .	1,422	20,468,189	18,282,037	6,932,792	. . . .	. . . .	. . . . .	. . .	. . .	. . .
1872 . .	1,470	21,648,343	23,197,623	7,369,473	245,880	122,034	863,198	38.35[2]	11.20	12.15
1873 . .	1,871	26,064,245	29,101,509	9,040,477	280,117	160,263	1,267,573	28.50	10 45	13.00
1874 . .	1,925	27,806,549	32,444,823	9,579,797	257,692	196,682	1,729,436	28.50	10.45	13.00
1875 . .	1,967	29,266,934	34,961,012	9,681,999	265,888	228,158	2,324,100	28.50	10.45	13.00
1876 . .	2,053	29,608,666	36,913,707	10,024,442	314,772	291,712	2,553,112	26.20	10.95	13.70
1877 . .	2,145	29,159,970	37,421,220	10,621,324	389,522	308,008	2,604,948	25.75	10.90	14.05
1878 . .	2,435	30,655,440	40,243,215	11,561,529	412,656	382,930	3,001,172	25.05	11.30	13.45
1879 . .	2,552	30,751,072	41,052,742	12,707,669	515,480	456,174	2,997,018	28.05	10.78	12.14
1880 . .	2,724	37,767,012	43,032,882	14,837,925	800,835	645,215	4,266,676	31.75	14.30	12.60
1881 . .	2,870	36,168,888	43,950,022	16,227,096	864,048	841,136	5,285,580	33.13	12.85	13.18
1882 . .	3,005	38,707,890	47,986,402	17,706,437	1,401,170	1,104,064	6,285,984	36.81	13.27	13.25
1883 . .	3,074	39,425,172	49,637,604	16,696,592	1,780,802	1,261,796	7,023,396	36.48	12.99	13.80

1884 . .	3,129	39,491,767	50,465,943	16,917,754	2,608,088	1,234,874	7,402,392	37.88	12.93	13.71
1885 . .	3,173	41,725,313	51,233,224	17,516,859	2,957,048	1,296,412	8,010,264	38.24	12.28	14.89
1886 . .	3,200	38,731,150	51,657,884	17,946,659	3,320,890	1,347,180	8,572,896	38.50	12.75	14.50
1887 . .	3,217	40,003,119	54,064,304	19,400,746	3,697,578	1,448,914	9,623,510	38.22	12.62	14.57
1888 . .	3,227	42,132,746	57,883,610	20,777,889	4,146,620	1,530,258	11,294,984	38.27	12.67	14.64
1889 . .	3,235	43,114,349	59,957,199	21,548,450	4,417,136	1,628,460	12,314,642	37.96	12.64	14.66
1890 . .	3,249	44,939,857	64,228,892	22,332,541	4,847,214	1,741,738	14,388,322	38.66	12.78	14.70
1891 . .	3,269	46,099,527	67,432,178	22,929,544	5,258,906	1,789,016	16,209,074	38.90	12.98	14.74
1892 . .	3,276	46,343,226	68,515,978	22,880,637	5,731,018	1,947,358	17,027,012	39.12	13.00	14.76
1893 . .	3,279	47,123,592	70,969,992	22,954,883	6,304,630	2,066,970	18,421,374	39.04	13.02	14.74
1894 . .	3,289	51,369,532	74,773,172	23,960,196	7,014,062	2,189,674	19,848,086	39.38	12.90	14.75
1895 . .	3,299	50,411,389	76,937,198	24,810,341	7,288,768	2,278,520	21,375,212	39.25	12.91	14.76
1896 . .	3,330	52,877,800	82,676,592	25,568,913	7,791,182	2,488,898	24,908,200	39.37	12.91	15.01
1897 . .	3,340	57,160,275	91,359,843	26,784,076	8,671,438	2,564,336	30,183,821	39.24	13.05	15.15
1898 . .	. . . . .	. . . . . .	101,957,734	29,360,136	9,579,716	2,951,396	35,773,906	39.54	12.83	16.93
1899 . .	. . . . .	. . . . . .	114,858,223	32,359,716	10,588,466	3,204,256	42,267,853	38.90	13.14	17.14

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[1] Franc = 19.3 cents. Centime = 0.193 cent. Kilometer = 6.21 miles.

[2] Probably 28.35.

PASSENGER STATISTICS OF BRITISH RAILWAYS—PASSENGER RECEIPTS BY CLASSES.

	First Class.	Second Class.	Third Class.	Season Tickets.	Total.	Excess Baggage, etc.[1]	Total.
1889 . .	£3,187,527	£2,704,734	£19,785,444	£2,195,968	27,873,673	4,757,051	32,630,724
1890 . .	3,193,691	2,645,705	21,142,847	2,316,384	29,298,627	5,029,338	34,327,965
1891 . .	3,143,609	2,527,481	21,809,859	2,432,970	29,913,919	5,216,997	35,130,916
1892 . .	3,121,628	2,376,368	22,216,955	2,537,952	30,252,903	5,409,913	35,662,816
1893 . .	3,036,036	2,075,179	22,623,316	2,582,848	30,317,379	5,532,070	35,849,449
1894 . .	2,965,730	1,972 451	23,276,224	2,648,124	30,862,529	5,632,959	36,495,488
1895 . .	3,034,449	1,935,029	23,796,137	2,760,352	31,525,967	5,835,195	37,361,162
1896 . .	3,133,149	2,058,139	24,780,290	2,914,767	32,886,345	6,234,520	39,120,865
1897 . .	3,210,482	2,306,318	25,491,880	3,027,220	34,035,900	6,482,164	40,518,064
1898 . .	3,200,867	2,585,627	26,216,247	3,180,743	35,183,484	6,663,590	41,847,074

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[1] Including receipts for parcels, carriages, horses, dogs and mails.

PASSENGER STATISTICS OF BRITISH RAILWAYS—NUMBER OF PASSENGERS BY CLASSES.

	First Class.	Second Class.	Third Class.	All Classes.	Season Ticket-holders.[1]
1889 .	30,074,810	62,687,927	682,420,336	775,183,073	1,271,212
1890	30,187,067	62,859,854	724,697,125	817,744,046	1,259,211
1891 .	30,423,776	63,378,397	751,661,495	845,463,668	1,402,776
1892	30,602,324	61,847,813	771,985,251	864,435,388	1,611,510
1893 .	30,048,982	59,989,640	783,138,430	873,177,052	1,574,876
1894 .	29,821,010	60,161,714	821,430,202	911,412,926	1,184,861
1895 .	29,990,006	58,567,859	841,213,044	929,770,909	1,196,827
1896 .	31,362,498	60,372,782	888,604,153	980,339,433	1,263,863
1897 .	32,497,673	62,762,650	935,159,878	1,030,420,201	1,286,508
1898 .	33,037,190	66,199,930	963,673,996	1,062,911,116	1,283,045

PASSENGER STATISTICS OF BRITISH RAILWAYS—PASSENGER RECEIPTS PER MILE OF LINE.

	First Class. £	Second Class. £	Third Class. £	Season Tickets. £	Total £	Excess, Baggage, etc.[2] £	Total. £
1889 . .	160	136	992	110	1,398	238	1,636
1890 . . .	159	132	1,053	116	1,460	250	1,710
1891 . . .	156	125	1,080	121	1,482	258	1,740
1892 . . .	154	117	1,093	125	1,489	266	1,755
1893 . . .	147	100	1,096	125	1,468	268	1,736
1894 . . .	142	94	1,113	127	1,476	269	1,745
1895 . . .	143	92	1,124	130	1,489	275	1,764
1896 . . .	147	97	1,165	137	1,546	293	1,839
1897 . . .	150	108	1,189	141	1,588	302	1,890
1898 . . .	148	119	1,210	147	1,624	308	1,932

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[1] Including workmen's weekly tickets.

[2] Including receipts for parcels, carriages, horses, dogs and mails.

PASSENGER STATISTICS OF BRITISH RAILWAYS—RECEIPTS PER TRAIN MILE AND PER MILE OF RAILWAY.

Year.	Per Train Mile.				Per Open Mile of Railway.			
	England and Wales. Pence.[1]	Scotland. Pence.	Ireland. Pence.	United Kingdom. Pence.	England and Wales. £.	Scotland. £.	Ireland. £.	United Kingdom. £.
1889 .	59.28	53.65	53.78	58.37	4,467	2,576	1,072	3,696
1890 .	59.59	53.27	54.37	58.61	4,617	2,621	1,102	3,813
1891 .	59.22	51.97	54.13	58.12	4,710	2,689	1,103	3,881
1892 .	58.45	52.56	52.89	57.49	4,680	2,748	1,081	3,864
1893 .	58.01	52.90	52.50	57.13	4,491	2,738	1,069	3,722
1894 .	58.54	52.51	52.83	57.56	4,670	2,597	1,096	3,820
1895 .	58.61	53.30	52.01	57.65	4,689	2,772	1,074	3,844
1896 .	59.10	52.88	50.40	57.93	4,909	2,853	1,074	4,009
1897 .	58.99	51.39	50.81	57.66	5,052	2,914	1,097	4,123
1898 .	58.66	52.10	50.68	57.48	5,136	3,010	1,112	4,205

PASSENGER STATISTICS OF BRITISH RAILWAYS.

	Passenger Cars.		Other Vehicles Attached to Passenger Trains.		Passenger Train Mileage, Miles.	Proportion of Passenger to Total Traffic Receipts.			
	Number.	Number per Mile of Line.	Number.	Number per Mile of Line.		England and Wales.	Scotland.	Ireland.	United Kingdom.
1889 .	36,137	1.81	13,501	0.68	161,082,875	44	40	54	44
1890 .	37,068	1.85	13,813	0.69	166,666,787	45	42	54	45
1891 .	39,122	1.94	14,344	0.71	171,758,552	45	41	54	45
1892 .	40,079	1.97	14,741	0.73	175,925,722	46	41	54	45
1893 .	41,058	1.99	15,705	0.76	177,365,247	47	41	55	47
1894 .	41,500	1.99	16,161	0.77	179,835,832	46	43	54	46
1895 .	42,230	1.99	16,507	0.78	184,184,290	46	41	53	46
1896 .	42,284	1.99	16,699	0.78	193,661,054	46	41	54	46
1897 .	44,053	2.05	17,358	0.81	202,199,634	46	42	54	46
1898 .	45,125	2.08	17.898	0.83	209,007,959	46	42	54	46

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[1] An English penny = 2.03 cents.

PASSENGER STATISTICS OF DANISH STATE RAILWAYS.

	1896.	1897.	1898.	1899.
Length of Railways Operated by State, kilometers	. . .	. . .	1,776	1,810
Number of Passenger Cars	825	866	978	1,065
Number of Seats in Passenger Cars	35,310	36,989	42,756	46,330
Distance made by Passenger Cars, kilometers	36,050,269	37,195,110	40,833,161	46,054,378
Distance Made by Seats of Passenger Cars (millions), kilometers	1,425.4	1,522.0	17,045	1,855.7
Distance Made by Seats of I Class Passenger Cars (millions), kilometers	86.6	93.2	98.8	95.0
Distance Made by Seats of II Class Passenger Cars (millions), kilometers	357.4	367.6	409.9	511.6
Distance Made by Seats of III Class Passenger Cars (millions), kilometers	981.4	1,061.2	1,195.8	1,249.1
Percentage of Seats Occupied, I Class	6.7	7.0	6.9	7.4
Percentage of Seats Occupied, II Class	19.2	19.6	21.2	19.5
Percentage of Seats Occupied, III Class	28.5	27.8	30.3	33.2
Percentage of Seats Occupied, total	22.9	23.5	24.4	24.7
Number of Passengers Carried	12,840,950	13,320,922	14,589,434	16,498,141
Percentage of Passengers, I Class	0.7	0.7	0.6	0.6
Percentage of Passengers, II Class	12.7	12.8	12.7	13.1
Percentage of Passengers, III Class	86.6	86.5	86.7	86.3
Number of Passengers per Kilometer of Road	7,416	7,693	8,326	9,193
Passenger Kilometers Traveled	367,094,556	387,436,220	456,098,215	521,993,942
Percentage of Passenger Kilometers, I Class	1.6	1.7	1.5	1.4
Percentage of Passenger Kilometers, II Class	18.7	18.6	19.1	19.1
Percentage of Passenger Kilometers, III Class	79.7	79.7	79.4	79.5
Passenger Density	211,996	223,744	260,285	290,869
Number of Passengers per Train	46.1	45.0	48.6	49.7
Average Journey, I Class, kilometers	66.2	65.8	71.4	68.4
Average Journey, II Class, kilometers	42.0	42.4	47.0	46.4
Average Journey, III Class, kilometers	26.4	26.8	28.7	29.1
Average Journey, All Classes, kilom'rs	28.6	29.1	31.3	31.6

Kilometer = 0.62 mile. Crown = 25.8 cents. Ore = 0.268 cent.

FINNISH STATE RAILWAYS.

	1897.	1898.
Length of State Railways, kilometers	2,408	2,482
Number of Passenger Cars	540	632
" " Car Seats	17,840	20,589
" " " per kilometer	7.21	8.30
Number of Passengers	4,263,475	5,595,914
" " kilometers	222,399,101	282,881,326
Passenger Density	92,358	113,973
Average Distance Traveled, kilometers	52.2	50.6
" Haul, kilometers	127.5	126.9
Receipts per Passenger Kilometer, centimes	3.3	3.1
Percentage of Passengers, I Class	0.62	. . .
" " II "	12.35	. . .
" " III "	85.92	. . .

Franc = 19.3 cents.

PASSENGER STATISTICS OF FRENCH RAILWAYS.

	State Railway.	Northern Railway.	Eastern Railway.	Western Railway.	Paris and Orleans Railway.	Paris, Lyons and Mediterranean Railway.	Southern Railway.
Average Length, 1897, kilometers	2,791	3,745	4,833	5,434	5,112	8,757	3,250
Average Length, 1898, kilometers	2,813	3,746	4,834	5,577	5,112	8,987	3,401
Average Length, 1899, kilometers	2,857	3,749	4,835	5,590	5,112	9,024	3,457
Number of Passengers, 1897	11,501,031	66,955,472	58,773,450	90,036,909	31,804,396	61,745,611	18,790,902
Number of Passengers, 1898	11,636,552	69,795,007	60,730,642	92,512,502	32,492,122	63,812,434	19,265,431
Number of Passengers, 1899	12,099,711	73,672,010	62,526,380	96,229,530	33,853,710	65,450,220	20,170,146
Average Length of Journey, 1897, kilometers	40.9	28.7	25.36	21.4	46.8	46.0	48.6
Average Length of Journey, 1898, kilometers	41.9	28.7	25.40	20.7	47.3	47.0	49.5
Average Length of Journey, 1899, kilometers	41.8	28.7	25.63	20.9	47.2	47.0	49.7
Receipts[1] per Passenger Kilometer, 1897, centimes	3.66	3.47	4.04	3.92	3.81	4.30	4.02
Receipts per Passenger Kilometer, 1898, centimes	3.64	3.39	3.94	3.83	3.74	4.24	3.95
Receipts per Passenger Kilometer, 1899, centimes	3.60	3.33	3.92	3.74	3.77	4.20	3.92
Receipts per Passenger Mile, 1899, cents.	1.11	1.04	1.21	1.16	1.17	1.31	1.22
Number of Passenger Cars, 1899	1,783	4,565	3,589	4,525	3,828	6,535	2,473
Receipts[1] per Passenger, 1898, francs	1.52	0.97	1.01	0.79	1.77	1.97	1.95
Receipts per Passenger, 1899, francs	1.50	0.96	1.02	0.78	1.78	1.97	1.95
Percentage of Passengers, 1899, I Cl.	1.80	4.2	4.68	9.45	3.58	5.0	3.6
Percentage of Passengers, 1899, II Cl.	7.69	15.3	32.65	48.37	9.91	10.9	9.1
Percentage of Passengers, 1899, III Cl.	90.51	80.5	62.67	42.18	86.51	84.1	87.3

Percentage of Income, 1899, I Cl	6.90	18.8	15.0	16.78	17.74	23.4	15.2
Percentage of Income, 1899, II Cl	18.06	28.0	28.4	38.70	18.52	22.3	17.5
Percentage of Income, 1899, III Cl.	75.04	53.2	56.6	44.52	63.74	54.3	67.3
Average Journey, 1899, I Cl., kilometers	105.0	. .	45.01	. .	123	. .	. .
Average Journey, 1899, II Cl., kilometers	80.6	. .	19.52	. .	72	. .	. .
Average Journey, 1899, III Cl., kilometers	37.4	. .	27.36	. .	41	. .	. .
Average Journey, 1899, all Classes, kilometers	41.8	. .	25.63	. .	47.2	. .	. .
Receipts per Passenger, 1899, I Cl., francs	5.95	4.29	. .	1.390	8.81	9.30	8.05
Receipts per Passenger, 1899, II Cl., francs	3.57	1.75	. .	0.626	3.32	4.02	3.72
Receipts per Passenger, 1899, III Cl., francs	1.25	0.63	. .	0.826	1.31	1.27	1.48
Receipts per Passenger Kilometer, 1899, I Cl., centimes	5.66	. .	7.15	5.37	7.17	. .	. .
Receipts per Passenger Kilometer, 1899, II Cl., centimes	4.43	. .	4.46	4.01	4.63	. .	. .
Receipts per Passenger Kilometer, 1899, III Cl., centimes	3.33	. .	3.32	3.19	3.17	. .	. .

Franc = 19.3 cents. Centime = 0.193 cent. Kilometer = .621. A centime per kilometer = 0.311 cent per mile.

[1] Including passenger tax.

PASSENGER STATISTICS OF GERMAN RAILROADS (STANDARD GAUGE).

Year.	Length of Railway. Kilometers.	Receipts from Passengers and Baggage. Marks. (000.)	Passenger Cars. Number.	Average Cost of Car. Marks. (000.)	Passenger Mileage. Kilometers. (000.)	Passenger Density.	Receipts per Passenger. Kilometer. Pfennigs.	Number of Passengers Killed.	Number of Passengers Injured.	Number of Passenger Cars per 100 Kilometers.	Receipts from Baggage.[1] Marks. (000.)
1868	16,367	117,350	8,916	7.2	3,212,813	202,900	3.74	. .	. . .	55	6,918
1869	17,446	126,937	9,503	7.3	3,534,453	212,100	3.68	. . .	. . .	56	7,233
1870 . . .	18,887	143,745	10,434	7.2	4,372,759	245,100	3.32	. . .	. . .	56	16,068
1871	21,482	170,523	11,153	7.2	5,020,893	262,400	3.43	. . .	. . .	56	16,659
1872	22,437	180,257	12,715	7.2	5,012,177	232,800	3.64	. . .	. . .	58	11,131
1873	23,901	196,148	14,587	7.3	5,692,691	247,100	3.54	. . .	. . .	62	11,529
1874	25,498	207,988	16,360	7.5	5,843,659	243,200	3.59	. .	. . .	67	11,375
1875	27,981	219,845	17,520	7.5	5,994,287	229,300	3.68	. . .	. . .	65	12,016
1876	29,316	222,622	18,343	7.5	6,109,415	218,600	3.65	. . .	. . .	64	12,500
1877–78	30,729	219,317	18,763	7.5	6,111,899	207,500	3.60	. . .	. . .	62	12,049
1878–79	31.504	220,013	19,355	. .	6,153,015	201,200	3.59	. . .	. . .	63	12,239
1879–80	. . .	. . .	. . .	. .	. .	. . .	. .	. . .	. . .	.	12,149

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[1] From 1868–1879–80, inclusive, these receipts were not included in the general passenger receipts.

PASSENGER STATISTICS OF STANDARD GAUGE RAILROADS OF GERMANY.

Year.	Length of Railway. Kilometres.	Receipts from Passenger and Baggage Traffic. Marks. (000.)	Number of Passenger Cars.	Cost of Car in thousands. Marks.	Passenger Kilometers in thousands.	Passenger Density.	Receipts per Passenger Kilometer. Pfennigs.	Number of Passengers Killed.	Number of Passengers Injured.	Number of Passenger Cars per 100 Kilometers.
1879–80	33,322	216,485	19,804	. .	6,148,677	192,200	3.53	. .	. .	61
1880–81	33,838	236,413	19,950	7.5	6,480,871	195,000	3.50	. .	. .	59
1881–82	34,382	245,118	20,483	7.5	6,784,354	200,900	3.48	. .	. .	60
1882–83	35,081	254,017	20,932	7.5	7,067,388	205,500	3.46	. .	. .	60
1883–84	35,993	262,668	21,740	7.6	7,373,980	210,600	3.43	. .	. .	61
1884–85	36,779	269,874	22,242	7.6	7,696,187	214,100	3.38	. .	. .	61
1885–86	37,572	274,384	22,873	7.7	7,943,510	215,900	3.34	. .	. .	62
1886–87	37,967	284,629	23,224	7.7	8,363,725	225,400	3.29	43	141	62
1887–88	39,082	293,897	23,703	7.8	8,707,769	229,600	3.26	27	107	61
1888–89	40,008	309,903	24,386	7.8	9,208,805	235,700	3.26	31	123	62
1889–90	40,920	333,865	25,404	7.9	10,172,387	254,400	3.18	40	174	63
1890–91	41,818	357,046	26,399	8.1	11,224,438	274,300	3.08	46	236	64
1891–92	42,269	367,646	27,512	8.3	11,679,050	280,900	3.05	46	153	66
1892–93	42,908	366,457	28,901	8.5	11,782,400	279,700	3.01	46	217	68
1893–94	43,500	384,703	29,675	8.6	12,552,155	294,000	2.97	70	186	69
1894–95	44,109	392,198	30,354	8 9	12,810,542	295,800	2.96	42	188	70
1895–96	45,203	421,074	31,423	9.0	13,917,284[1]	315,400	2.92	60	254	70

Mark = 23.8 cents. Pfennig = 0.238 cent. Kilometer = 0.621 mile. A pfennig per kilometer = 0.383 cent per mile.

[1] Since 1895–96 the travel of soldiers riding free of cost is not included.

NUMBER OF PASSENGERS (NOT INCLUDING SOLDIERS) BY ZONES ON HUNGARIAN RAILWAYS.

Zones.	1888.[1]	1891.	1895.	1896.	1897.	1898.	1888. Per Ct.	1891. Per Ct.	1897. Per Ct.	1898. Per Ct.
1. Local or Suburban Traffic . .	2,001,400	8,210,141	10,894,078	5,696,647	4,771,239	4,914,384	32.39	31.85	14.83	14.83
2. " " " . .		7,693,619	9,043,005	4,339,838	4,456,705	4,588,433		29.84	13.85	13.84
3. " " " . .		. . . .	. . . .	6,209,815	4,880,675	5,027,102		. .	15.16	15.17
I Through Traffic		2,166,327	4,338,094	8,231,701	8,277,883	8,528,223		8.40	25.73	25.73
II " "	1,251,900	1,909,746	2,693,094	2,923,117	2,783,049	2,867,584	20.26	7.41	8.65	8.65
III " "	857,800	1,303,095	1,661,113	1,725.611	1,431,176	1,475,469	13.88	5.05	4.45	4.45
IV " "	455,500	870,563	1,181,858	1.192,904	1.051,510	1,083,199	7.37	3.38	3.27	3.27
V " "	323,900	604,566	675,573	703,988	694,973	715,853	5.24	2.34	2.16	2.16
VI " "	247,100	445,687	555,005	570,949	465,018	480,099	4.00	1.73	1.45	1.45
VII " "	179,100	304,413	373,267	386,181	291,364	299,596	2.90	1.18	0.91	0.90
VIII " "	161,100	330,257	412,223	423,968	358,465	372,184	2.61	1.28	1.12	1.12
IX " "	121,900	192,606	216,248	226,393	174,790	176,459	1.97	0.75	0.54	0.53
X " "	109,600	166,860	188,875	195,074	158,306	163,100	1.77	0.65	0.49	0.49
XI " "	94,200	156,515	177,506	207,245	149,136	153,936	1.52	0.61	0.46	0.47
XII " "	91,200	203,973	252,147	296,048	266,627	274,958	1.48	0.79	0.83	0.83
XIII " "	120,800	327,850	486,178	662,225	565,365	582,870	1.96	1.27	1.76	1.76
XIV " "	163,600	895,196	1,169,775	1,450,231	1,397,855	1,442,914	2.65	3.47	4.34	4.35
Total	6,179,100	25,781,414	34,318,039	35,441,935	32,174,136	33,146,363	100.00	100.00	100.00	100.00

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[1] The statistics for 1888 show the results obtained before the introduction of the zone tariff.

PASSENGER RECEIPTS ON HUNGARIAN RAILWAYS (INCLUDING PASSENGER TAX) IN THOUSANDS OF CROWNS.

	1888.	1891.	1895.	1896.	1897.	1898.	1888. Per Cent.	1891. Per Ct.	1897. Per Ct.	1898. Per Ct.
1. Local or Suburban Traffic	1,430	1,770	2,346	1,728	1,012	1,047	7.37	4.77	1.80	2.01
2. “ “ “ “		2,582	2,924	1,772	1,408	1,455		6.96	2.89	2.79
3. “ “ “ “		. . .	. . .	1,274	2,072	2,141		. . .	4.10	4.10
I Through Traffic . .		1,386	2,602	4,522	4,756	4,920		3.73	9.42	9.43
II “ “ . . .	2,104	2,326	3,168	3,312	3,286	3,399	10.84	6.27	6.51	6.52
III “ “ . . .	2,098	2,346	2,946	3,006	2,516	2,603	10.81	6.32	4.98	4.99
IV “ “ . . .	1,436	2,138	2,906	2,958	2,536	2,625	7.40	5.76	5.02	5.03
V “ “ . . .	1,360	1,908	2,124	2,184	2,128	2,202	7.00	5.14	4.21	4.22
VI “ “ . . .	1,202	1,656	2,104	2,192	1,780	1,842	6.19	4.46	3.54	3.53
VII “ “ . . .	978	1,328	1,638	1,688	1,292	1,327	5.04	3.58	2.56	2.54
VIII “ “ . . .	1,054	1,718	2,172	2,246	1,884	1,951	5.43	4.63	3.73	3.74
IX “ “ . . .	832	1,116	1,280	1,334	1,024	1,042	4.29	3.01	2.03	2.00
X “ “ . . .	860	1,068	1,234	1,268	1,026	1,063	4.43	2.88	2.03	2.04
XI “ “ . . .	884	1,122	1,298	1,446	1,088	1,125	4.55	3.02	2.16	2.16
XII “ “ . . .	1,032	1,612	2,010	2,212	2,130	2,206	5.32	4.34	4.22	4.23
XIII “ “ . . .	1,504	3,212	4,782	5,864	5,638	5,840	7.75	8.66	11.13	11.19
XIV “ “ . . .	2,636	9,824	12,374	14,598	14,928	15,378	13.58	26.47	29.67	29.48
	19,410	37,112	47.908	53,604	50,504	52,166	100.00	100.00	100.00	100.00

Crown = 20.3 cents.

STATISTICS OF PASSENGER TRAFFIC OF INDIAN RAILWAYS.

	1897.	1898.
Average Length, miles	20,530.86	21,475.64
Number of Passengers	151,263,816	152,584,321
“ “ per Mile of Road	7,368	7,110
“ Passenger Miles	5,930,946,976	5,821,266,709
Passenger Density	288,879	273,100
Passenger Receipts, rupees	88,588,748	86,892,203
Average Journey, miles	39.22	38.53
Average Haul of Freight	142.85	162.12
Revenue per Passenger, I Class (Broad Gauge Roads), cents[1]	159.3	159.6
“ “ “ II “ “ “ “ “	40.0	37.4
“ “ “ III “ “ “ “ “	31.5	29.9
“ “ “ III, IV “ “ “ “ “	15.6	15.3
“ “ “ All Classes “ “ “ “	17.6	17.2
“ “ Passenger Mile, I Class “ “ “ “	2.17	2.21
“ “ “ “ II “ “ “ “ “	0.86	0.86
“ “ “ “ III “ “ “ “ “	0.57	0.56
“ “ “ “ III, IV “ “ “ “ “	0.43	0.43
“ “ “ “ All Classes “ “ “ “	0.49	0.48
“ “ “ “ I Class (Meter Gauge Roads), “	2.59	2.59
“ “ “ “ II “ “ “ “ “	1.05	1.16
“ “ “ “ III “ “ “ “ “	0.60	0.73
“ “ “ “ III, IV “ “ “ “ “	0.42	0.41
“ “ “ “ All Classes “ “ “ “	0.43	0.43

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[1] Rupee taken at 32.5 cents.

STATISTICS OF PASSENGER TRAFFIC OF INDIAN RAILWAYS.

	Broad Gauge Roads.		Meter Gauge Roads.[1]	
	1897.	1898.	1897.	1898.
Number of Passengers, I Class	468,162	506,021	137,349	142,756
" " II "	2,720,933	3,069,418	778,747	653,803
" " III "	4,585,985	4,681,572	547,738	909,142
" " III,IV "	87,121,990	88,982,418	54,014,614	51,428,984
Total Number of Passengers	94,897,070	97,239,429	55,478,448	53,134,685
Passenger Receipts, I Class, rupees . .	2,287,611	2,468,445	607,849	626,594
" " II " " . .	3,361,655	3,531,207	1,030,096	1,001,838
" " III " " . .	4,429,984	4,328,849	546,952	731,956
" " III, IV " " . .	41,474,042	41,574,664	21,864,643	20,684,158
Total Passenger Receipts	51,553,302	51,903,165	24,079,540	23,044,546
Passenger Miles, I Class	37,500,420	39,922,441	8,473,587	8,724,824
" " II "	140,256,711	148,477,248	35,663,940	31,142,373
" " III "	275,711,796	269,070,512	32,878,580	36,574,291
" " III, IV "	3,468,421,627	3,443,495,852	1,908,101,952	1,823,967,373
Total Passenger Miles	3,921,890,554	3,900,966,053	1,985,118,059	1,900,408,861
Average Journey, I Class, miles . .	80.13	78.90	61.85	61.01
" " II " " . .	51.55	48.40	45.78	47.62
" " III " " . .	60.43	57.47	59.99	40.24
" " III, IV " " . .	39.81	38.68	35.33	35.49
" " All Classes, " . .	41.22	40.13	35.78	35.75

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[1] Of the total railway mileage 58.2 per cent are broad, 39.8 per cent meter, and 2 per cent varying gauge. The latter 2 per cent are not included in these statistics.

PASSENGER STATISTICS OF ITALIAN RAILWAYS.

Year.	Length in Kilometers on December 31.	Mean Length During Year.	Number of Passenger Cars.	Passenger Car Mileage. Kilometers.	Number of Passengers.	Distance Traveled. Passenger Kilometers.	Passenger Revenue. Lire.
1871	6,377	6,266	...	...	...	...	...
1872	6,754	6,560	3,801	119,337,170	25,530,309	1,203,655,438	61,329,162
1873	6,882	6,752	3,919	127,595,081	26,254,326	1,212,299,851	63,907,454
1874	7,373	6,976	4,053	131,113,020	27,319,675	1,239,510,651	65,055,316
1875	7,675	7,406	4,195	139,776,574	27,951,146	1,286,907,831	68,280,327
1876	7,935	7,696	4,264	142,936,873	28,076,067	1,327,694,295	67,680,976
1877	8,178	7,963	4,324	147,008,786	28,055,467	1,362,491,064	68,288,646
1878	8,208	8,176	4,301	151,968,024	28,954,439	1,390,955,589	68,670,535
1879	8,328	8,289	4,400	158,613,625	30,405,347	1.439,819,618	69,534,267
1880	8,713	8,512	4,586	163,107,455	32,491,827	1,524,126,394	74,552,462
1881	8,893	8,837	4,701	170,141,792	34,040,515	1,640,557,740	79,864,875
1882	9,184	9,009	4,943	172,701,287	34,372,056	1,655,832,698	79,977,035
1883	9,602	9,339	5,400	183,917,459	36,817,031	1,735,375,525	82,854,263
1884	10,067	9,818	5,616	201,261,641	36,358,791	1,637,895,851	79,750,430
1885	10,526	10,292	5,921	210,885,582	40,765,374	1,782,933,416	83,602,680
1886	11,387	10,966	6,179	224,636,694	42,651,313	1,858,418,121	86,288,698
1887	11,831	11,556	6,549	235,379,986	45,518,604	2,099,224,207	95,132,681
1888	12,588	12,098	7,201	254,183,699	49,333,266	2,294,080,565	100,580,634
1889	13,046	12,874	7,942	262,890,172	50,989,457	2,258,169,896	99,506,926
1890	13,149	13,102	8,187	264,663,248	50,855,569	2,212,825,853	98,517,946
1891	13,393	13,263	8,222	265,845,865	49,570,716	2,192,102,762	100,095,443
1892	13,987	13,907	...	...	...	...	...
1893	14,503	14,431	...	...	...	...	...
1894	14,944	14,868	...	...	...	...	...
1895	15,425	15,317	...	...	...	...	...
1896	15,447	15,444	...	...	...	...	...

Lire equals 19.3 cents. Kilometer equals 0.621 mile.

ITALIAN RAILWAY PASSENGER TRAFFIC STATISTICS.

	1894.	1895.	1896.	1897.	1898.
Average Year's Length of Railway, kilometers	14,756	15,217	15,500	15,710	15,802
Length of Railways at End of Year, kils.	14,999	15,479	15,500	15,585	15,753
Number of Passenger Cars	8,517	8,547	8,536	8.581	8,578
Number of Passenger Cars per kilometer of road	0.568	0.552	0.551	0.547	0.543
Number of Passengers Carried[1]	51,658,609	52,574,844	53,009,933	54,047,964	55,495,613
" " First Class	1,858,890	1,842,727	1,836,396	1,867,835	1,876,157
" " Second Class	12,001,300	11,996,651	11,966,944	12,096,327	12,205,956
" " Third Class	37,726,671	38,670,704	39,147,123	40,023,889	41,350,003
" " Fourth Class	71,748	64,762	59,470	59,913	63,497
Number of Passenger Kilometers	2,202,604,802	2,226,209,922	2,256,092,593	2,326,076,546	2,425,637,159
Average Journey, All Classes, kilom's	43	42	42	43	44
" " First Class, "	80	80	79	82	79
" " Second Class, "	47	48	48	49	48
" " Third Class, "	39	39	39	39	41
" " Fourth Class, "	24	25	25	25	25
Receipts from Passenger Traffic, lire	100,985,481	102,803,040	103,538,559	106,497,602	108,871,781
Receipts per Passenger Kilometer, centimes	....	4.26	4.25	....	....
Receipts per Passenger Kilometer, First Class, centimes	....	8.40	8.58	....	....
Receipts per Passenger Kilometer, Second Class, centimes	....	5.66	5.68	....	....
Receipts per Passenger Kilometer, Third Class, centimes	....	3.31	3.30	....	....
Receipts per Passenger Kilometer, Fourth Class, centimes	....	3.14	3.10	....	....

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[1] Not including season tickets.

PASSENGER STATISTICS OF JAPANESE RAILWAYS—YEAR ENDING MARCH 31.

	1895.	1896.	1897.	1898.	1899.	1900.
Length of Road, miles	2,580.69	2,794.34	3,034.51	3,691.32	4,412.01	4,752.61
Number of Passenger Cars	1,646	1,943	2,266	2,817	3,720	4,067
Number of Passengers	36,584,269	48,271,869	65,107,898	84,453,362	98,582,117	102,263,814
Passenger Receipts, yen	8,634,715	11,796,653	13,727,172	17,652,577	20,523,757	24,708,099
Total Railroad Receipts, yen	13,742,569	18,786,795	21,147,084	27,831,955	32,985,200	39,461,382
Number of Passengers Killed	2	16	6	8	13	33
" " Injured	24	149	63	121	159	329

A yen = 49.8 cents.

PASSENGER STATISTICS OF LEADING MEXICAN RAILWAYS—NUMBER OF PASSENGERS CARRIED.

Year.	Mexican.	Mexican National.	Interoceanic.	Mexican Central.	Mexican International.
1873	476,287	247,547			
1874	459,601	584,075			
1875	267,776	486,788			
1876	245,675	486,000			
1877	300,591	565,572			
1878	279,893	529,333			
1879	293,179	535,806			
1880	323,088	466,897	228,053		
1881	331,749	903,049	367,116	303,543	
1882	385,621	900,855	411,090	491,985	
1883	409,098	1,071,835	406,016	653,669	
1884	389,421	878,878	634,306	761,687	15,942
1885	377,512	839,573	606,510	694,894	9,853
1886	367,260	891,711	569,421	769,655	10,411
1887	380,153	884,541	621,295	797,693	9,796
1888	393,679	907,113	673,169	756,560	41,170
1889	444,149	929,685	596,812	683,147	53,194
1890	502,139	937,527	657,616	736,730	59,327
1891	620,988	998,617	795,625	753,276	64,641
1892	628,591	1,012,786	799,487	735,363	60,967
1893	629,892	935,167	879,005	792,025	74,577
1894	717,076	576,574	881,810	945,434	77,456
1895	772,139	926,516	906,550	1,030,911	102,858
1896	746,353	692,769	960,958	1,259,623	111,480
1897	769,780	733,395	1,033,344	1,683,385	129,107
1898	783,785	846,229	1,130,517	1,663,950	169,142
Total	12,295,475	19,768,938	13,158,700	15,523,530	989,921

PASSENGER STATISTICS OF LEADING MEXICAN RAILWAYS—PASSENGER REVENUES.[1]

Year.	Mexican.	Mexican National.	Interoceanic.	Mexican Central.	Mexican International.[2]
1873.	$482,565	$17,425	. . . . . .	. . . . . .	. . . . . .
1874.	467,816	40,446	. . . . . .	. . . . . .	. . . . . .
1875.	476,546	43,027	. . . . . .	. . . . . .	. . . . . .
1876.	380,018	43,437	. . . . . .	. . . . . .	. . . . . .
1877.	533,520	52,759	. . . . . .	. . . . . .	. . . . . .
1878.	518,318	71,193	. . . . . .	. . . . . .	. . . . . .
1879.	517,711	74,277	. . . . . .	. . . . . .	. . . . . .
1880.	548,941	91,505	$65,277	. . . . . .	. . . . . .
1881	587,135	124,452	105,083	$62,270	. . . . . .
1882.	696,235	225,267	111,029	442,726	. . . . . .
1883.	710,636	341,614	223,049	726,830	. . . . . .
1884.	655,458	517,316	247,528	1,111,906	$30,858
1885.	603,886	492,822	240,233	1,111,062	25,881
1886.	604,278	538,359	224,815	1,185,662	29,242
1887.	665,312	537,520	239,812	1,251,743	32,516
1888.	694,138	691,915	254,809	1,337,734	125,848
1889.	765,118	864,309	271,562	1,436,301	140,676
1890.	701,916	887,437	383,107	1,487,086	149,258
1891.	832,185	994,951	456,685	1,512,415	170,304
1892.	797,878	973,768	466,799	1,442,310	181,378
1893.	768,616	972,488	486,075	1,443,793	219,624
1894.	857,525	865,698	491,914	1,576,801	208,551
1895.	993,016	1,005,515	491,388	1,828,072	276,514
1896.	982,351	962,327	512,437	1,934,612	313,904
1897.	1,022,641	1,031,214	547,965	2,257,328	362,019
1898.	1,055,505	1,134,771	589,226	2,469,886	449,171
Total.	$17,909,278	$13,595,824	$6,408,803	$24,618,546	$2,715,749

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[1] Mexican (silver) currency; fractions of dollars disregarded. Silver dollar irregularly sunk after 1873. January 1, 1901, it was 50.9 cents.

[2] The railways of the Federal District carried 3,760,563 passengers in 1873, 21,236,097 in 1898, and 285,572,742 for the whole twenty-six years, receiving $232,347 in 1873, $1,442,843 in 1898 and $19,805,513 during the period. Although usually included in Mexican railroad statistics, I have excluded them as they are street or urban railways. Of these five railroads, in 1898 the Mexican received 25 per cent, the Mexican National 18 per cent, the Interoceanic 18 per cent, the Mexican Central 18 per cent, and the Mexican International only 14 per cent of total revenue from passengers.

Passenger Traffic Statistics on Norwegian Railways.

	1897–98.	1898–99.
Average Length in Kilometers	1,967	1,983
Number of Passenger Cars	579	586
“ Seats in Passenger Cars	23,267	24,271
“ “ “ “ per kilometer	11.8	12.2
“ Passengers	8,356,011	9,355,266
“ Passenger Kilometers	198,588,981	219,678,669
Passenger Density	100,960	110,781
Average Journey, kilometers	23.8	23.5
Average Haul (freight), kilometers	66.2	66.6
Passenger Receipts per Kilometer, crowns	3,023	3,336
Receipts per Passenger Kilometer, oere	2.7	2.8
Receipts per Ton Kilometer, oere	4.8	4.6

	I Class.	II Class.	III Class.	All Classes.
Percentage of Passengers (1898)	0.1	7.3	92.6	100.0
Percentage of Passengers (1899)	0.1	8.2	91.7	100.0
Percentage of Passenger Miles (1898)	0.9	13.5	85.6	100.0
Percentage of Passenger Miles (1899)	0.9	14.7	84.4	100.0
Percentage of Occupied Seats (1898)	8.8	14.2	24.4	22.0
Percentage of Occupied Seats (1899)	10.6	15.7	25.3	22.9
Average Journey (1898), kilometers	169.1	44.6	21.1	23.9
Average Journey, (1899), kilometers	178.2	42.5	21.8	23.7
Receipts per Passenger (1898), oere	1,210	178	54	66
Receipts per Passenger (1899), oere	1,268	166	54	66
Receipts per Passenger Kilometer (1898), oere	7.2	4.0	2.4	2.7
Receipts per Passenger Kilometer (1899), oere	7.1	3.9	2.5	2.8

Crown = 26.8 cents. Oere = 0.268 cent. Kilometer = 0.621 mile.

PASSENGER TRAFFIC ON PORTUGUESE RAILWAYS.

	Total Railway. Net.		State Railways. Broad Gauge.	
	1897.	1898.	1897.	1898.
Average Length, kilometers	2,362	2,362	834	834
Number of Passengers .	9,599,117	11,384,737	1,550,002	1,650,624
Receipts from Passensengers, milreis[1] . .	2,874,730	3,062,451	809,385	819,266
Number of Passengers, First Class	606,099	775,982	132,279	134,747
Number of Passengers, Second Class	2,465,338	3,106,882	298,434	322,332
Number of Passengers, Third Class	6,527,680	7,501,873	1,119,289	1,193,605

	Private Railways. Broad Gauge.		Narrow Gauge Railways.	
	1897.	1898.	1897.	1898.
Average Length, kilometers	1,325	1,325	203	203
Number of Passengers .	7,221,643	8,854,343	827,472	879,710
Receipts from Passengers, milreis	1,917,765	2,093,085	147,581	150,100
Number of Passengers, First Class	379,899	549,603	93,921	91,632
Number of Passengers, Second Class	1,492,497	2,054,696	674,407	729,854
Number of Passengers, Third Class	5,349,247	6,250,044	59,144	58,224

In 1899 the length of railways operated was 2,362 kilometers, the receipts from passengers 3,162,245 milreis, and the number of passengers carried 11,404,764, of whom 815,148 were in the first, 3,342,443 in the second, and 7,247,173 in the third class.

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[1] Milreis = $1.08. Kilometer = 0.621 mile.

Accidents on Russian Railways.

Year.	Passengers.		Per 1,000,000 Passengers.		Per 100,000,000 Passenger Versts.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
1887	19	88	0.50	2.30	0.5	2.4
1888	52	153	0.21	3.56	1.2	3.5
1889	29	77	0.64	1.72	0.6	1.7
1890	28	103	0.60	2.22	0.6	2.2
1891	51	152	1.06	3.15	1.0	3.0
1892	42	130	0.85	2.64	0.8	2.5
1893	37	137	0.72	2.66	0.7	2.6
1894	43	149	0.77	2.68	0.7	2.6
1895	40	181	0.66	2.97	0.6	2.5
1896	62	362	0.90	5.30	0.8	4.5
1897	126	471	1.69	6.31	1.4	5.4

Passenger Traffic Statistics on Russian Railways.

	1888.	1896.	1897.
No. of Passengers . . .	42,966,000	68,348,000	74,668,000
No. of Passengers (versts)	3,950,470,000	8,065,261,000	8,506,800,000
Average journey (versts)	101.26	118.00	115.27
Percentage of Occupied Seats	36.14	38.53	38.46
Passenger Revenue (rubles)[2]	46,773,055	65,942,121	68,071,502
Passenger Revenue per Verst of Line (rubles)	1,826.64	1,986.81	1,989.26
Revenue per Passenger (kopecks)	108.85	96.45	91.17
Revenue per Passenger Verst (kopecks) . . .	1.08	0.82	0.80
No. of Soldiers carried .	3,139,039	4,266,490	4,347,999
No. of Prisoners carried .	416,914	459,560	440,227
No. of Passengers with Passes	2,101,534	2,856,917	3,297,879
No. of Men Carried Accompanying Cattle .		195,443	208,233
No. of Passengers with Tickets Paid for . . .	37,308,768	60,569,587	66,374,006
Total No. of Passengers .	42,966,255	68,347,897	74,668,344
No. of Paying Passengers, I Class	584,000	963,000	934,000
No. of Paying Passengers, II Class.	2,922,000	6,482,000	6,982,000
No. of Paying Passengers, III Class	35,965,000[1]	49,328,000	54,588,000
No. of Paying Passengers, IV Class	837,000	3,797,000	3,870,000

[1] Appears to be too high.

[2] Ruble = 51.5 cents. Kopeck = 0.515 cent. Versts = 0.6629 mile.

PASSENGER TRAFFIC STATISTICS ON SWEDISH RAILWAYS.

	State Railways.		Private Railways.		Total Railways.	
	1897.	1898.	1896.	1897.	1896.	1897.
Length of Railways at End of Year, kil's.	3,676	3,676	6,136	6,287	9,895	9,963
Average Year's Length, kilometers . . .	3,676	3,676	6,116	6,233	9,769	9,903
Number of Passenger Cars	987	967	1,259	1,284	2,271	2,315
Number of Passengers	8,521,784	9,239,258	12,630,720	14,216,430	. . . . . .	. . . . . .
Number of Passenger Kilometers	398,286,024	369,856,717	238,150,197	271,425,374	543,200,000	669,700,000
Receipts from Passenger Traffic, crowns .	14,023,923[1]	13,735,040[1]	9,371,826	10,425,872	20,800,000	34,400,000[2]
Percentage of Receipts from Pass. Traffic	38.84	36.31	. . . . . .	. . . . . .	20.8	34.4
Receipts from Passenger Traffic per Kilometer, crowns	3,815.00	3,736.41	1,549	1,682	. . . . . .	. . . . . .
Receipts per Passenger Kilometer, oere[3] .	3.2	3.0	3.9	3.9	. . . . . .	. . . . . .
Percentage of Passengers, First Class . .	0.3	0.3	. . . . . .	. . . . . .	. . . . . .	. . . . . .
" " Second Class .	13.2	13.2	. . . . . .	. . . . . .	. . . . . .	. . . . . .
" " Third Class . .	84.8	85.2	. . . . . .	. . . . . .	. . . . . .	. . . . . .
" " Military Class .	1.7	1.3	. . . . . .	. . . . . .	. . . . . .	. . . . . .
" of Pass. Kilo., First Class . .	2.6	2.2	. . . . . .	. . . . . .	. . . . . .	. . . . . .
" " Second Class .	23.8	24.4	. . . . . .	. . . . . .	. . . . . .	. . . . . .
" " Third Class . .	68.4	73.4	. . . . . .	. . . . . .	. . . . . .	. . . . . .
" " Military Class .	5.2		. . . . . .	. . . . . .	. . . . . .	. . . . . .
Average Distance, First Class, kilometers	370	79	. . . . . .	. . . . . .	. . . . . .	. . . . . .
" " Second Class, "	84		. . . . . .	. . . . . .	. . . . . .	. . . . . .
" " Third Class, "	38	34	. . . . . .	. . . . . .	. . . . . .	. . . . . .
" " Military Class "	146		. . . . . .	. . . . . .	. . . . . .	. . . . . .
Receipts per Passenger, First Class, crowns	28,54	3.55	. . . . . .	. . . . . .	. . . . . .	. . . . . .
" " " Second Class, "	3.69		. . . . . .	. . . . . .	. . . . . .	. . . . . .
" " " Third Class, "	1.02	0.96	. . . . . .	. . . . . .	. . . . . .	. . . . . .
" " " Military Class, "	2.01		. . . . . .	. . . . . .	. . . . . .	. . . . . .

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[1] Including baggage and postal traffic. [2] Apparently 24,400,000.

[3] Crown = 26.8 cents. Oere = 0.268 cent. Kilometer = 0.621 mile.

PASSENGER STATISTICS OF SWISS RAILWAYS.[1]

Year.	Mileage of Passenger and Mixed Trains. Kilometers.	Daily No. of Passenger Trains Over Whole Railroad, net.	No. of Passenger Kilometers.	Passenger Density.	Proportion of Seats Occupied. Per Cent.	Passenger Receipts. Francs.
1883 .	11,781,800	11.35	568,721,363	199,973	32.27	30,844,933
1884 .	12,042,869	11.41	521,357,623	180,719	30.70	27,728,265
1885 .	12,285,712	11.65	539,672,509	186,738	30.70	28,950,766
1886 .	12,522,255	11.82	544,209,570	183,994	29.90	29,179,741
1887 .	12,827,453	11.95	566,373,518	192,631	29.50	30,009,395
1888 .	13,470,793	12.32	578,435,298	193,631	28.60	31,147,035
1889 .	14,148,662	12.68	654,772,429	214,188	29.50	34,765,081
1890 .	15,279,553	13.14	701,779,485	220,318	28.60	36,988,852
1891 .	16,214,381	13.55	726,764,370	221,683	27.57	37,155,295
1892 .	16,568,386	13.53	758,669,743	226,675	27·60	38,533,949
1893 .	16,834,012	13.39	786,157,422	228,333	27.82	40,304,754
1894 .	17,426,587	13.57	842,419,929	239,403	27.71	42,933,752
1895 .	17,974,744	13.78	891,272,601	249,418	27.80	45,298,066
1896 .	18,909,050	14.27	967,211,584	267,204	27.69	47,596,277
1897 .	20,044,209	14.87	1,026,300,440	277,851	27.83	49,971 075
1898 .	20,888,216	15.27	1,105,615,977	294,984	27.86	53,474,337

PASSENGER TRAFFIC STATISTICS OF ALGERIAN-TUNISIAN RAILWAYS—(FIRST FIGURES FOR 1898; FIGURES FOR 1897 IN PARENTHESES).

The average length during the year was 3,482 (3,397) kilometers, or 2,162 (2,009) miles; number of passengers, 3,808,865 (3,570,999); distance traveled, 174,032,705 (161,327,501) passenger kilometers, or 108,100,000 (101,200,000) passenger miles; the number of passenger cars was 763 (714); the average journey, 45.7 (45.2) kilometers, or 28.4 (28.1) miles; the average freight haul, 79.6 (82.2) kilometers; the receipts per traveler, 2.43 (2.47) francs, or 46.9 (47.7) cents; the average receipts per passenger kilometer were 5.31 (5.46) centimes, or per passenger mile, 1.65 (1.70) cents, American money.

PASSENGER STATISTICS OF CAPE COLONY RAILWAYS—(FIGURES FOR YEAR 1899; THOSE IN PARENTHESES FOR 1898).

Average length, 1,990 (1,990) miles; passenger income, £869,325 (865,635); number of passengers, 11,006,870 (10,013,432); number of passenger cars, 645 (590); number of passengers killed in accidents, 12 (41); injured, 24 (22).

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[1] Franc = 19.3 cents. Kilometer = 0.621 mile.

RAILWAYS OF THE WORLD.

Europe.	Length of Railways at End of Year.					Increase. 1895-99.		Mileage.		Per Cent of Total World's Mileage.
	1895. Kilometers.[6]	1896. Kilometers.	1897. Kilometers.	1898. Kilometers.	1899. Kilometers.	Kilometers.	Per Cent.	Per 100 Square Kilo'rs. Kilom'rs.	Per 10,000 Inhabitants. Kilom'rs.	
Germany	46,413	47,348	48,116	49,560	50,511	4,098	8.8	9.3	9.7	6.5
Russia[1]	37,717	38,612	40,262	42,535	45,998	8,281	21.9	0.9	4.3	6.0
France	40,230	40,949	41,343	41,704	42,211	1,981	4.9	7.9	10.9	5.5
Austria-Hungary[2]	30,880	32,180	33,668	35,113	36,275	5,395	17.5	5.4	8.2	4.7
Great Britain and Ireland	34,058	34,221	34,485	34,668	34,868	810	2.4	11.0	8.6	4.5
Italy	15,057	15,447	15,643	15,715	15,723	666	4.4	5.5	5.0	2.0
Spain	12,052	12,872	12,916	13,048	13,281	1,229	10.2	2.6	7.3	1.7
Sweden	9,755	9,895	10,169	10,240	10,723	968	9.9	2.4	21.4	1.4
Belgium	5,687	5,777	5,904	6,089	6,194	507	8.9	21.0	9.3	0.8
Switzerland	3,509	3,563	3,646	3,708	3,769	260	7.4	9.1	12.4	0.5
Holland[3]	3,102	3,129	3,129	3,164	3,189	87	2.8	9.0	6.1	0.4
Roumania	2,741	2,880	2,880	3,051	3,091	350	12.8	1.9	5.1	0.4
Turkey[4]	2,254	2,430	2,554	2,569	3,059	805	35.7	1.1	3.2	0.4
Denmark	2,267	2,309	2,543	2,605	2,840	573	25.3	7.2	12.3	0.4
Portugal	2,340	2,358	2,362	2,362	2,375	25	1.5	2.6	4.7	0.3
Norway	1,779	1,938	1,952	1,981	1,981	202	11.3	0.6	9.3	0.3
Greece	930	952	952	952	972	42	4.5	1.5	4.0	0.1
Servia	540	570	570	570	578	38	7.0	1.2	2.5	0.1
Other Countries[5]	110	110	110	110	110	....	...	...	...	..
All Europe	251,421	257,540	263,204	269,744	277,748	26,327	10.5	2.8	7.3	36.0

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[1] European (including Finland).

[2] Including Bosnia and Herzegovina.

[3] Including Luxemburg.

[4] European (including Bulgaria and Roumelia).

[5] Malta, Jersey and Man.

[6] Kilometer = 0.621 mile.

Railways of the World.

America.[1]	Length of Railways at End of Year.					Increase 1895–99.		Mileage.		Per Cent of Total World's Mileage.
	1895. Kilometers.[4]	1896. Kilometers.	1897. Kilometers.	1898. Kilometers.	1899. Kilometers.	Kilometers.	Per Cent.	Per 100 Sq. Kilo. Kilometers.	Per 10,000 Inhabitants. Kilometers.	
United States[2]	292,431	294,088	296,745	299,911	304,576	12,145	4.1	3.9	41.1	39.4
Canada[2]	25,712	26,183	26,866	27,161	27,755	2,043	7.9	0.3	52.9	3.6
Argentine	14,119	14,462	14,755	15,817	16,114	1,995	14.1	0.6	57.2	2.1
Brazil	12,064	13,023	13,941	14,038	14,798	2,734	22.7	0.2	8.7	1.9
Mexico	11,890	12,158	13,685	13,685	13,685	1,795	15.1	0.7	10.8	1.8
Chile	3,166	4,032	4,286	4,286	4,493	1,327	41.9	0.6	15.0	0.6
Cuba	1,778	1,778	1,778	1,825	1,825	47	2.6	1.5	11.2	0.2
Peru	1,667	1,667	1,667	1,667	1,667	. . . .	. . .	0.1	5.6	0.2
Uruguay	1,605	1,605	1,605	1,605	1,605	. . . .	. .	0.9	19.4	0.2
Central America[3]	1,000	1,000	1,038	1,041	1,041	41	4.1	0.2	4.4	0.1
Venezuela	1,020	1,020	1,020	1,020	1,020	. . . .	. . .	0.1	4.2	0.1
Bolivia	1,000	1,000	1,000	1,000	1,000	. . . .	. . .	0.1	4.1	0.1
Total America	370,175	374,941	381,567	386,337	392,860	22,685	6.1			50.9

[1] For South and Central America, data are sometimes estimated.

[2] Fiscal year.

[3] Includes Guatemala, Honduras, Nicaragua and Costa Rica.

[4] Kilometer = 0.621 mile.

RAILWAYS OF THE WORLD.

Other Countries.	Length of Railways at End of Year.					Increase 1895–99.		Mileage.		Per Cent of Total World's Mileage.
	1895. Kilometers.[4]	1896. Kilometers.	1897. Kilometers.	1898. Kilometers.	1899. Kilometers.	Kilometers.	Per Cent.	Per 100 Sq. Kilo. Kilometers.	Per 10,000 Inhabitants. Kilometers.	
British India	31,322	32,458	33,812	35,384	36,188	4,866	15.5	0.7	1.2	3.1
Australia	22,318	22,341	23,119	23,334	23,615	1,297	5.8	0.3	51.7	0.8
Siberia	1,753	3,038	3,801	4,144	6,029	4,276	243.9	0.05	10.4	0.8
Japan	3,600	3,686	4,032	4,747	5,846	2,246	62.4	1.4	1.3	0.6
British South Africa[1]	3,932	4,053	3,634	3,781	4,727[3]	....	...	0.6	26.8	0.6
Algiers and Tunis	3,301	4,113	4,251	4,251	4,251	950	28.8	0.5	6.7	0.4
Egypt	2,027	2,327	2,824	3,358	3,358	1,331	65.7	0.3	3.4	0.4
Asia Minor[2]	1,770	1,949	2,509	2,509	2,760	990	55.8	0.1	1.8	0.3
Russian Central Asia	1,433	1,513	1,513	2,525	2,669	1,236	86.2	0.5	38.1	0.3
Java and Sumatra	2,076	2,082	2,082	2,082	2,082	6	0.3	0.3	0.8	0.3
Continents.										
Europe	251,121	257,540	263,204	269,744	277,748	26,327	10.5	2.8	7.3	36.0
America	370,175	374,941	381,567	386,337	392,860	22,685	6.1	...	...	50.9
Asia	43,375	46,549	49,756	53,605	57,822	14,447	33.3	...	...	7.5
Africa	13,147	14,827	15,844	17,954	20,114	6,967	53.0	...	...	2.6
Australia	22,318	22,341	23,119	23,334	23,615	1,297	5.8	...	...	3.0
Total	700,436	716,198	733,490	750,974	772,159	71,723	10.2			100.0

[1] And British Central Africa. [2] Including Syria. [3] Apparently 3,727. [4] Kilometer = 0.621 mile.

APPROXIMATE RAILWAY CAPITAL OF VARIOUS COUNTRIES.

Country.	Year.	Approximate Capital. in Dollars.	In Per Cent of United States.
United States	1899	11,034,000,000	100
United Kingdom	1898	5,450,000,000	49
France	1898	3,164,000,000	29
Germany	1898–99	2,945 000,000	27
Russia (without Finland)	1898	2,073,000,000	19
Austria	1899	1,244,000,000	11
Italy	1898	988,000,000	9
Canada	1899	972,000,000	9
British India	1898	804,000,000	7
Australia	. . . .	654,000,000	6
Spain	1889	546,000,000	5
Argentina	1898	509,000,000	5
Hungary (State Railways)	1899	424,000,000	4
Belgium " "	1898	344,000,000	3
Switzerland	1898	247,000,000	2
Holland	1897	138,000,000	1
Algiers and Tunis	1898	132,000,000	1
Roumania	1895	120,000,000	1
Cape Colony	1899	102,000,000	1

With exception of the United States, the statistics are taken from the "Archiv für Eisenbahnwesen," the mark being roughly taken at twenty-four cents.

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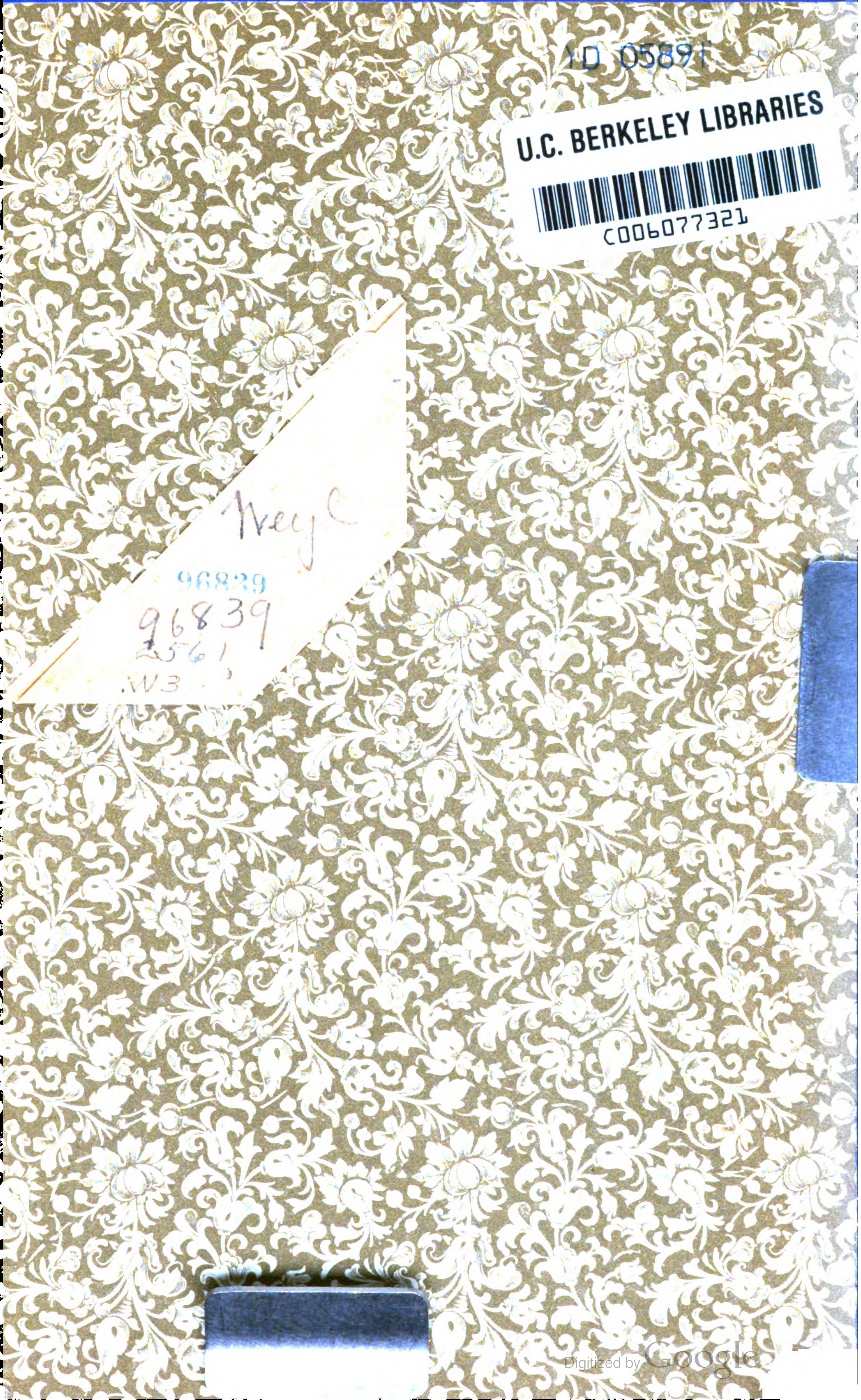

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